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Electric Steel for Roller Bearings

New Type of Ingot-Handling Machine
in the Plant of the Timken Roller Bearing Co.—Furnaces Located in Pits

AN electric steel plant of large capacity, designed for quality production of alloy steels, that are used for the most part in its own plant in the manufacture of roller bearings, has recently been built by the Timken Roller Bearing Co., Canton, Ohio. The plant also supplies steel for its allied interest, the Timken-Detroit Axle Co., and manufactures special electric and alloy steels for the trade. The plant was laid out primarily, however, with a view to providing a steel works to make steel to meet the company's requirements.

Recent additions to the Timken plant in Canton include a tube-mill department equipped with an electrically driven piercing mill for rolling seamless-steel tubing. This plant was described in *THE IRON AGE*, April 27, 1916. With the completion of the steel plant the company has combined in one unit all the manufacturing processes, from making the steel itself to the production of a highly finished product.

The steel plant is equipped with four 6-ton Heurtault electric furnaces. The combined capacity of the furnaces is 125 tons of ingots in 24 hours. The ingots are broken down in a hydraulically operated 600-ton forging press. An unusually interesting feature of the plant is an electrically operated manipulator that handles the ingots while they are being broken down, taking the place of a jib crane and porter bar. This manipulator is a new type of equipment for use in a steel plant, and in general design and operation largely resembles an open-hearth charging machine.

The steel plant is located in a modern type of

mill building, 284 ft. long and 80 ft. wide. At right angles to this, and connected at the lower end, is a rolling-mill building, 266 ft. long and 110 ft. wide. Adjoining the lower end of this, parallel to the building housing the melting department, is the tube-mill building. With this arrangement the product passes from the steel plant through the finishing-mill department and on to the lower end of the latter, adjoining which is the charging end of the heating surface of the tube mill.

A large scrap storage space is provided on the floor at the upper end of the furnace building. Scrap is brought in on standard railroad cars over a track that traverses this section of the plant, and the cars are unloaded with an electric traveling crane and electric magnet. The melting department is equipped with two 15-ton and one 5-ton cranes that perform the handling service in the building for handling scrap, molten metal, ingots and billets.

The electric furnaces are located along one side of the building, and at the lower end at this side is the reheating furnace. Opposite the electric furnace on the other

side of the building, adjoining the side wall, is a pouring platform, 7 ft. wide, 60 ft. long and 4 ft. high. Further down on the same side are the soaking pits, forging press and manipulator.

The furnaces are placed in pits 10 ft. deep, making them conveniently located for charging in the doors on each side from the floor level, and pit space is provided in front for the ladle when tapping. They have basic bottoms, the side walls and roofs are lined with silica brick,



The Four Electric Furnaces Are Located in Pits, Making Them Convenient for Charging from the Floor Level

and the bottoms are of magnesite. The transformers back of the furnaces are elevated 10 ft. above the floor level.

Two grades of steel are produced for the company's use, one running from 0.15 to 0.20 per cent carbon for seamless-tube stock, which is used for cups and cones for roller bearings, and the other has the same percentage of carbon, but 0.80 to 1.25 per cent of chromium, the latter being added for steel which is rolled into small round bars, 9/16 in. in diameter and under, which is cold-drawn and manufactured into rollers used in bearings.

A typical furnace charge is 3000 lb. of tube-mill scrap, 2000 lb. of roller-bearing scrap (these being produced in the company's adjoining manufacturing plants), and 9000 lb. of shrapnel turnings. The product in both grades runs about 0.40 to 0.60 per cent manganese, 0.10 to 0.15 per cent silicon, and 0.03 and under in sulphur and phosphorus, the only difference in the two grades being the presence of chromium in one of them.

The furnace charge, which is all shovel scrap, is placed in charging boxes by means of the cranes and magnet and charged by hand from these to the furnaces. The average time of a heat is 4½ hr.

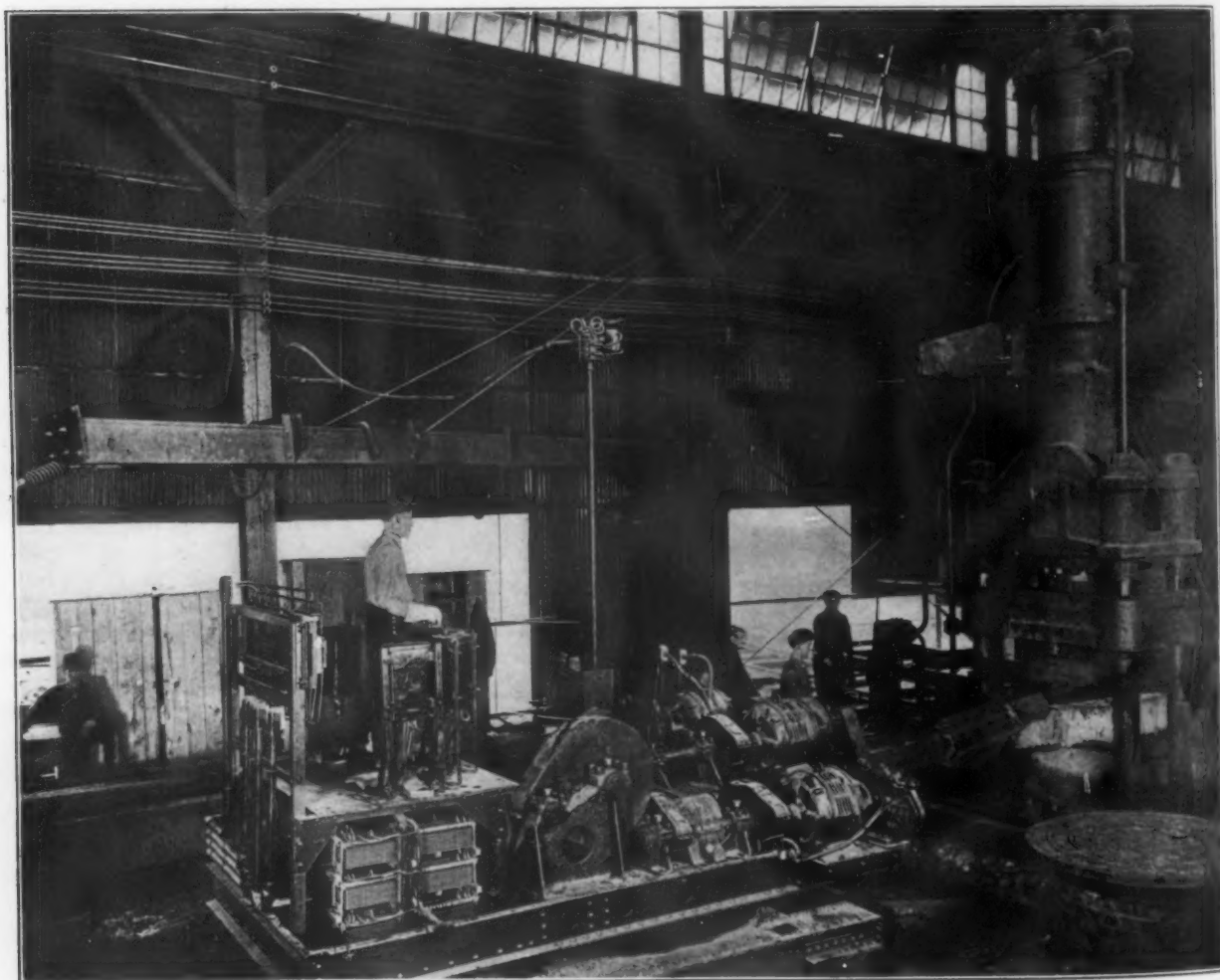
Electricity, which is purchased from the Central Power Co., is supplied to the plant in 3-phase, 60-cycle, 11,000-volt alternating current. This will be supplied later at 22,000 volts. It is delivered to the furnaces at 110 volts, by three 400-kva. oil-insulated, air-cooled Westinghouse transformers for each furnace. The electrodes are handled by the Thury system of control. Each electrode is raised

and lowered by a 3-hp., 200-volt, direct-current motor, there being three motors for each furnace.

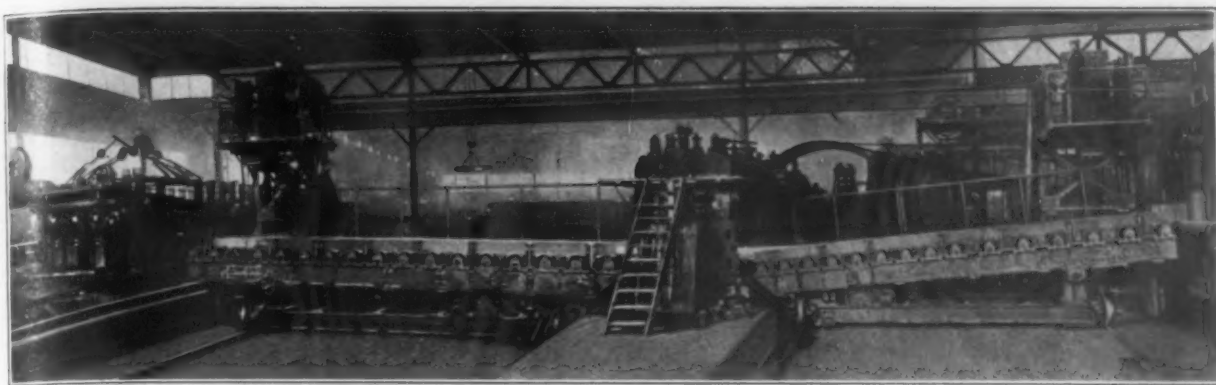
The direct current is furnished by a motor-generator set of 9-kw. capacity, a separate set being provided for each furnace, which is tilted by a 35-hp. motor in the pit, geared to the tilting mechanism. In melting down the full capacity of the transformers 1200 kw. is used at the start, and after the charge becomes molten it is cut down to 600-kw. capacity. The current consumption is about 3900-kw. hr. per heat of 6 tons. The power factor on the furnace averages 88 to 90.

The steel is poured in 6-ton ladles and is cast in ordinary molds of one size, 16 in. square. The stripped ingots are heated in two 6-ingot hole gas or oil-fired soaking pits, 9 ft. long, 6 ft. wide, and 7 ft. deep, having a capacity to heat 150 tons of ingots in 24 hr.

The ingots are usually reduced on the forging press to 7 x 8-in. blooms, although they can be broken down to a 4 x 4-in. section. The manipulator, in the powerful jaws of which the ingots are held while being forged, has five movements, each provided by separate motors, and is controlled by one man, stationed on the machine. The machine itself is located on a 6-ft. gage track and has a forward and backward movement of 18 ft. Above the truck section is a revolving table, upon which the remainder of the machine is mounted, and permitting the mechanism to rotate. The jaw operating arm, about 12 in. in diameter, with jaws 3 ft. long at the end, revolves and also has an up-and-down motion like an elbow. The fifth movement is the grip of the jaws. The manipulator is provided with



A Manipulator Somewhat Resembling an Open Hearth Charging Machine, the First of This Type to Be Built. Takes the Place of a Jib Crane and Porter Bar for Handling Ingots While Being Broken Down in the Forging Press, Resulting in the Saving of Six Workmen



One of the Mill Stands and Tilting Tables in the Plant of the Timken Roller Bearing Co.

two 11-hp. and three 15-hp. motors for driving its operating mechanism.

The machine has a capacity for handling a 3000-lb. ingot, and the manipulator and press have a capacity for handling the maximum daily output of the electric furnaces. Three men on the press and one man for the manipulator are required to operate this unit, a saving of six men for a 12-hr. shift, as compared with the operation of the press when handling ingots with the jib crane or porter bar, before the machine was placed in operation.

Hydraulic power for the press is supplied by a pump with a capacity of 100 gal. per min. and 3000 lb. of water pressure per square inch. This is driven by a 200-hp. motor with 2300-volt, 60-cycle, 3-phase current.

After being broken down, the blooms are placed on a truck that operates on a track that runs to one side of the building, to a stock yard adjoining where they are chipped. In this stock yard is also handled steel brought into the plant to be rolled for other consumers. The stock yard is served by a 25-ton locomotive crane equipped with a 48-ft. boom.

The heating furnace of the rolling mill is a standard horizontal, continuous-discharge furnace, with a heating chamber 45 ft. 6 in. long and 10 ft. 8 in. wide, and with a capacity for taking blooms up to 9 x 10 in. and 8 ft. long, and having a rated capacity of 250 tons per 24 hr. The furnace is equipped with a combination of oil and gas burner, the oil supply being controlled with a needle valve in the burner, so that either oil or gas can be used, or both can be used at the same time. When the gas supply is plentiful the oil is not used, but during the past winter, when the gas supply was low, the combination fuel was used both in the reheating furnace and in the soaking pits where similar burners are provided. Oil is supplied at 20-lb. pressure and gas at 8-oz. pressure.

The steel is discharged from the furnace by a push bar electrically operated by a winch and two 35-hp. motors upon a roller table 12 ft. long, that adjoins the front tilting table to the mill.

The rolling mill consists of four stands of 3-high 22-in. mill. The first two stands are used for rolling 3½ to 6½-in. round bars for the tube mill and for rolling merchant bars, and the last two stands roll from 1½ to 3 15/16-in. rounds and square and flat bars. Two of the mill stands are roughing stands and two are finishing stands. The first roughing stand operates in connection with the first finishing stand, and in the case of 90 per cent of the product the second roughing stand operates with two finishing stands, in this respect differing from the usual practice. In the remaining 10 per cent of the production, when rolling sections that require a larger billet than can be rolled on the second roughing stand, the billets are given the roughing pass on the first roughing stand. The first rough-

ing pass is a box and edging pass. With the practice of producing square sections in the roughing rolls the necessity of an intermediate stand of rolls is eliminated. In the roughing stands are various passes for rolling round sections. The finishing stand has a leader or octagon pass at the top, and the steel goes from the upper pass to a round pass in the bottom for finishing. The mill is provided with two traveling tilting tables 29 ft. long.

The mill is driven by 1000-hp., 2300-volt, 60-cycle, 3-phase induction motor through a Dodge rope drive to a 20-ton flywheel. A Nuttall flexible coupling is provided between the rope and motor sheave. The motor is connected with a permanent slip resistance so proportioned that it will not be overloaded. On a heavy load the motor slows down and allows the flywheel to deliver its stored energy. The normal speed of the mill is 65 r.p.m. Each tilting table is driven by one 50 and two 30-hp. motors.

Two runout tables, each 110 ft. long, extend from the back tilting table to the end of the hot bed, one on each side. One table handles steel of the first roughing and finishing stands, and the second table the product of the other two stands. The hot bed, which is of the standard rolling type, is 80 ft. long and 30 ft. wide. Each runout table is driven by a 30-hp. motor.

At the side of the hot bed is an inspection floor, where the bars are laid out, inspected and marked. They are sheared at the lower end of the mill building, near the charging end of the continuous furnace of the tube mill, on vertical shears having a capacity up to 6 in. in diameter. According to present plans the hot bed will be made longer and a hot saw installed.

The mill building is served by a 10-ton crane, which is used in changing rolls and in handling the finished steel. With the exception of the direct-current motors that raise and lower the electrodes, alternating-current motors are used exclusively throughout the plant for operating the cranes and for other service.

The mill stands were built by the Standard Engineering Co., Ellwood, Pa., and Wheeling Mold & Foundry Co., Wheeling, W. Va., each furnishing one roughing and one finishing stand. The former company supplied the tilting tables and the latter company the runout tables. The reheating furnaces and the soaking pits were furnished by the W. R. Miller Co., Pittsburgh. The forging press and the hydraulic pump were supplied by the William Tod Co., Youngstown, Ohio, and the manipulator by the Alliance Machine Co., Alliance Ohio. The cranes were supplied by the Whiting Foundry Equipment Co. All motor equipment was supplied by the Westinghouse Electric & Mfg. Co. The stock yard locomotive crane was furnished by the McMyler-Interstate Co., Cleveland. The mill and melting shop buildings were erected by the Canton Bridge Co.

Modern Economies in Pickling Steel*

Equipment to Facilitate the Process—The Cleaning Solutions, Their Proper Strength and Temperature—Application to Drop Forgings

BY J. H. SNYDER

DURING the last five years, and more especially the last two years, on account of the rapid rise in the cost of labor and acid, practically all the larger plants and many of the smaller ones have made efficient changes in their pickling department to reduce labor and acid consumption, increase output and get a more uniformly pickled product. Experiments have been made with solutions of potash, Wyandotte cleaner, etc., to eliminate oils and grease preparatory to the acid bath, thereby saving a large percentage of acid.

Employment of Machinery

Conveying machinery, trucks, cars, cranes, etc., have recently been installed to increase output. Wire is now frequently sent from the mills to the cleaning departments on an endless chain conveyor, with hooks spaced at suitable intervals for holding the wire coils. Ordinary factory trucks are often used to transfer sheets, tin plate, forgings, pipe, castings, etc. Sometimes, where conditions are suitable, tracks are laid throughout the plant with switches and turntables and cars convey the material over these tracks to the different departments. In large plants electric cranes are used for carrying material to and from the cleaning department. Devices are attached to the crane hooks for carrying each particular product, thereby effecting an efficient means of transfer.

Electric hoists, air hoists and jib cranes assist the men to place and remove material being cleaned in the vats, and also to shift this material in the acid solution to obtain better results in cleaning. In many cases large electric cranes, used in the transfer of the production from one department to another, are used for this purpose. This method, used in several plants with more or less favor, has the following objections: The acid fumes constantly rise and come in contact with the electrical apparatus, causing increased maintenance cost and delays in operation; the objects lie motionless nearly all the time in the acid solution, which, on account of little or no agitation, is of varying density from bottom to top, so that certain portions of the objects are overpickled and other portions contain unpickled spots.

Many companies have installed pickling machines to take the place of electric cranes and reduce the labor. These machines are to a great extent acid proof, simple in design and fool proof in operation. The surging or plunger type, which has been in use a number of years, forces the acid up through the material being pickled by means of a plunger. This keeps the density of the acid throughout the vat constant. The machine is installed where an extremely large tonnage is desired and seems a great improvement over former methods, but since the material is not agitated the greatest economy is not reached.

A machine made by the Mesta Machine Co. agitates the material as well as the acid by moving the load up and down through the different solutions and is being used for almost every kind of product that is being pickled or cleaned. The machine is operated by steam or air from a central plunger carrying horizontal arms from which are suspended acid proof crates. The number of arms is governed by the number of baths required.

Pickling, rinsing and loading are all done simultaneously. Sudden admission of steam or air in the cylinder at the end of the down stroke of the plunger causes a snap which tends to separate and shift the

material so as to remove the scale or sand, scour the material and mechanically aid the chemical action of the acid. The advantages of this machine are: Crane service can be eliminated; labor can be materially reduced; acid required per ton pickled can be reduced; it is simple in design and fool-proof in operation; exhaust steam can be used for heating the vats; maintenance cost is low, and small floor space is required.

Sulphuric Acid and Pickling Compounds

To have ideal pickling the scale and oxides should be removed without any chemical action on the metal directly beneath them and great care should be exercised in the choice and strength of acids so a maximum cleaning action may be obtained with a minimum solvent action on the metal.

Acids used for pickling are sulphuric, muriatic or hydrochloric and hydrofluoric. Various compounds are also used. Sulphuric acid 60 deg. and 66 deg. Baumé is most generally used in this country. It is generally admitted that sulphuric acid solutions clean metal as well as other acid solutions if made strong enough to remove all scale with sufficient rapidity not to allow any part of the material to become overpickled, or combined carbon to precipitate and form a graphitic coat on the surface.

The proper percentage of sulphuric acid necessary is governed by experience and is controlled by the character of the material to be pickled. According to Comey (Dictionary of Chemical Solubilities) the rate of corrosion increases with concentration of acid up to a certain point, after which the rate of corrosion decreases. This variation is sometimes very irregular with different materials. The action of acids also increases by raising the temperature. Most men mixing solutions guess the amount of acid necessary; some test with the hydrometer, others tell by taste the strength of a solution.

Many companies change the sulphuric acid solution every 24 hr. When work is begun in the morning a solution of about 8 per cent sulphuric acid by volume is put into the vat and the proper amount of water is mixed with the acid. Throughout the day sufficient acid to keep the necessary strength is added. The vat which contains scale and ferrous salts is cleaned out completely and a new solution made for the next 24 hr. This is done where large tonnages are pickled. In most of the plants acid is added for two or three days, or even much longer than this, and from time to time the scale is cleaned out and some of the weakened acid solution drawn off.

Where the material to be pickled is covered with oil or grease potash solutions are used to clean the surfaces. Potash is very expensive and a substitute known as Wyandotte Cleanser is used. It is claimed that 50 per cent sulphuric acid is saved by proper cleaning of material preparatory to the acid bath.

Some substitutes used in place of sulphuric acid and in connection with it are Edis Compound, Kleanrite, Nitre Cake, etc. Edis Compound is manufactured in dry cakes which are soluble in water. The temperature of the solution is kept about the same as with acid. Kleanrite is a powdered compound, and is ordinarily used in a solution made up of 1 lb. of Kleanrite to 4 or 5 lb. of water. This solution may be varied to suit the character of the material. Nitre Cake is also used in a similar way. About 1 lb. is used per gal. of water. The substitutes have met with favor in some plants and it is said that they do not emit disagreeable fumes, such as is the case when pickling with sulphuric acid.

*From a paper presented at the annual meeting of the American Drop Forge Association at Cleveland, June 14-16, 1917. The author is with the Mesta Machine Co., Pittsburgh.

The amount of sulphuric acid per ton of steel pickled varies with the character of material and with the chemical analysis of the acid. It ranges from 60 lb. to 200 lb. per ton of steel. Arsenic is very detrimental in sulphuric acid, and if one-tenth of one per cent is contained in the acid, pickling is hindered to a considerable extent. A great deal more acid is required with 60 deg. than 66 deg. Baumé sulphuric acid and there is a tendency to more arsenic in the former than in the latter. However, some companies are pickling with 60 deg. Baumé acid. Considering the low cost of this acid, they claim to pickle as fast and for the same cost per ton as with 66 deg. acid.

Proper Pickling Temperatures

The temperature of the sulphuric acid solution should be kept as near the boiling point as possible. In various plants the temperature varies from 75 deg. Fahr. to 212 deg. Fahr. For hand pickling the temperature is generally preferred low on account of the danger of having a hot open acid vat into which workmen may fall. Usually where this method is used ventilation is very poor and laborers cannot work efficiently because of the steam. The temperature of the bath frequently is obtained by connecting a steam pipe to the vats from the low pressure boiler used for heating the office buildings, shop offices, etc. This necessitates long steam lines and the vats usually get what is left when all other requirements are provided for.

The usual practice in plants of ordinary size is to pipe live steam into the acid solution. In this case a great saving can be effected when pickling with a steam-operated machine by piping the exhaust steam through an oil separator into the vats. In some cases, especially in smaller plants, anti-acid coils are used to which steam is admitted, and in this way the solution of acid is not weakened by condensation of steam.

High temperature has a remarkable effect on the efficiency of the chemical action of the acid and it is extremely detrimental to good work, as well as extravagant in acid consumption, to use a luke-warm solution of sulphuric acid. On the other hand, it is claimed that when the bath is kept too hot a large amount of finely divided acid is carried up in the vapor which corrodes the structural steel of the building and, in time, may cause serious trouble.

The temperature of water in the vats is a problem which everyone must work out for himself, being governed entirely by the kind of material to be washed. Certain materials require cold water, while others require it as hot as possible. For instance, enameled ware is immersed in cold water, while sheets in heavy gages are rinsed in very hot water and allowed to dry from the heat thus absorbed. But lighter gage sheets must be put through a drying furnace to prevent rusting.

The following table shows the varying amounts of sulphuric acid by volume and the time necessary for successful pickling, together with the method used as a basis for the figures given:

Kind of Material	Per Cent of Acid by Volume	Average Pickling Time in Minutes	Method
Tin plate	2-10	6-10	Machine
Tin plate	10-20	10-20	Hand
Sheets	4-10	8-12	Machine
Sheets	10-18	10-20	Hand
Wire	6-12	15-30	Machine
Wire	10-20	25-50	Hand
Pipe	6-8	10-15	Machine
Pipe	8-20	20-25	Hand
Cold rolled steel	8-10	12-15	Machine
Cold rolled steel	10-15	20-25	Hand
Stampings	8-12	15-18	Machine
Forgings	8-10	15-18	Machine
Forgings	15-20	20-30	Hand
Enameled ware	10-15	15-20	Machine
Brass	10-15	5-8	Hand
Alloy Forgings	8-10	20-30	Machine
Alloy forgings	8-10	30-45	Hand

After the material is properly pickled it is transferred to the water bath, where the acids and ferrous salts are completely washed off.

A Well Constructed Wooden Vat

Vats used for pickling solutions are made of white

pine, cypress, California fir, birch, concrete, anti-acid tile brick and other material.

The most preferable material at present is No. 1 white pine, although it is somewhat expensive and difficult to get. When a vat is properly constructed from this material an average life of from two to four years is obtained. There are companies using concrete vats lead lined, wooden vats lead lined, and anti-acid tile brick with success. However, the cost of a vat made in this way is more than that of the ordinary wooden vat, and it is a question whether the added life justifies the extra cost.

A good construction of a wooden vat is to use 6 x 6's or 6 x 8's or 8 x 8's, painted with thick white lead and rabbeted together with copper bolts put down through the center. A false lining on the walls and the bottom of the inside of the vat is made of 1-in. match white pine. Guards made of 2 x 4's or 2 x 6's are placed up and down in the vat at different points to protect the lining. This lining is the only part of the vat that must be removed and repaired.

In the use of concrete tanks it is best to lead line them to keep the acid from being continually in contact with the concrete. Also, concrete chips very easily when struck by the crates while handling the material.

Ventilating the Pickling Room

An important factor in the pickling department is proper ventilation of the pickling room. The suggestion usually made is to construct a high building with a ventilator on top containing a double row of windows. This, however, is not the best method. When volumes of vapor rise in winter weather they are met with a strong current of air from the windows above, since cold air rushes into the room instead of allowing the warm vapor to wend its way out.

A well ventilated pickling room, not over 15 ft. high, has a single row of windows on one side of the building, slightly higher than the top of the vats. A small fan placed in the window opposite each acid vat induces a continuous volume of vapor and acid fumes, coming directly from the surface of the acid vat, to pass through it. Thus practically no vapors or fumes are left in the pickling room. The temperature of the room is about 60 deg. Fahr and it is important to keep it at least this high. It is customary in many plants to provide little heat to the pickling room and in winter workmen are forced to grope about amid clouds of vapor at almost a freezing temperature.

Another excellent method of ventilation is to take in cold air through a series of hot steam pipes and then force it up into a large horizontal pipe which runs along the pickling room about 15 ft. above floor level. In this horizontal pipe are several down comers, through which the hot air passes. The temperature is maintained at from 60 deg. to 70 deg. to prevent the formation of vapor. The fumes are forced up by the warm air and pass out of the building through a single row of windows at the top.

Another system forces air up through pipes placed near the floor level at an angle of about 45 deg. on the opposite side of the room from the vats. By this method, not only is the room heated in winter and cooled in summer, but the rising fumes are caught, taken up by the blast of air and carried out of the ventilator.

When a pickling department must be laid out in a large building containing machinery, a very good method is to build semi-circular brick walls around the vats, which tend to carry the fumes up 20 or 30 ft. A fan placed in a ventilator above will conduct them out with comparatively little damage.

Pickling Versus Sand Blasting

In the drop forge industry, pickling, tumbling and sand blasting are the three principal methods used in the cleaning department. Pickling is preferable if the acids and salts are thoroughly washed from the surfaces of the forgings.

Information received from one of the largest companies in the country shows there is no favorable comparison between pickling and sand blasting. In the former method all surfaces are cleaned thoroughly

from oxides or foreign substances which are detrimental to the machining operation, while in the method of tumbling and sand blasting, small forgings, tumbling together, hammer fine sand into their surfaces. The resulting cost of machining is 300 to 400 per cent more than that of pickled forgings. Furthermore, drop forgings containing small bores or indentations are not cleaned properly by sand blasting. The same authorities claim that all companies in the drop forging business eventually would pickle their product, as the additional cost is more than offset in machining.

In this connection the reclamation of waste acids for the manufacture of copperas is important. In one instance a company allowed waste acid to flow down the river for years and later reclaimed it with a net profit of \$60 per day. Comparatively few companies are doing this at present and these only experimentally. Within the next decade this by-product will be generally made throughout the country.

BRITISH WIRE-DRAWING

Steps in the Cleaning Process—Alloy Steels for Draw Plates

Wire drawing in its various stages was discussed recently by A. T. Adam before the Edinburgh Section of the Society of Chemical Industry (British). After briefly outlining the history of wire, he explained that it was difficult to define clearly a wire rod, because plants are now in operation which are drawing or rolling cold bars in round, square or hexagon, etc., up to $2\frac{1}{2}$ in. in diameter at least, probably more. In speaking of a wire rod, however, one generally means material which has been rolled hot to about $\frac{1}{2}$ in. diameter and under. Before the rods can be drawn through a die they must be freed entirely from scale of oxide, otherwise the hole through which the wire is drawn will be torn out. The rods are therefore pickled in sulphuric or hydrochloric acid. When the coils are dipped in the pickling tank, it is usual to have a solution, containing anything from 2 to 8 per cent or free acid, in which case the operation of cleaning takes about two hours. Slow cleaning is almost essential when the gage of the wire is small. A strong solution can be used when the gage is large or when the wire is drawn through the bath continuously instead of being dipped in the form of a coil.

The process of pickling may be hastened by using a hot bath. The acid bath works best when it has been in operation a few days, or when the specific gravity has been increased by sulphate or chloride of iron. If the specific gravity be too high, however, the cleaning action will cease unless heat is used. Mr. Adam has found the percentage of free acid in a spent tank as high as in a freshly made up tank. The specific gravity of the former was 1.28 and of the latter 1.03. Mechanical means have been tried to assist the acid in cleaning the higher class wires, but without much success. This is unfortunate because acid is apt to make the wire brittle unless great care is taken to remove it completely.

When all the scale has been removed from the wire it is thoroughly washed with water from a hose. The cheaper qualities of wire are then dipped in hot lime and dried, but with the higher grade wires, which have to receive several passes through the draw plate without annealing, it is necessary to give them a water coat. This is done by keeping the coils continually under a spray of water until a brown rust is formed. During this operation they must not be allowed to become dry. The wire is limed to neutralize any acid remaining and to prevent corrosion. The coil is dried in a blueing oven at 100 deg. C., where the last traces of acid should be driven off. The wire is then ready for cold drawing. The cleaning operation has to be performed not only on the raw wire rod, but also on the drawn wire, each time it has been annealed to facilitate further drawing. In drawing, the reduction effected at each pass through the die varies from 5 per cent to 20 per cent of the diameter according to the nature of the material. The draw plates are made from self-hardening steel's.

Some of the alloy steels are used nowadays for draw plates of special make; for example, one well-known make contains 14 per cent chromium and 3 per cent carbon. These elements form a very hard double carbide with the iron. The hole in the draw plate through which the wire passes is first punched hot, then sized and shaped correctly, when cold, with hardened and tempered tapered punches. Very fine wires are drawn through jeweled dies, diamonds and rubies being chiefly used. Before the wire enters the die it passes through tallow or olive oil soap which acts as a lubricant.

Some wires are drawn wet, in which case a liquid lubricant is used. Various secret lubricants are in vogue for the wet process, sour beer being a favorite ingredient of most of them. When the wire is to be drawn wet it is polished to give a bright metallic surface and is then coated with copper by immersion in a bath of copper sulphate. The copper being softer than the steel forms a kind of cushion between it and the die. It is drawn into the wire and gives it a yellow color. The process of drawing is repeated until the wire is finished or too hard to be drawn further without heat treatment.

A Small Diesel Engine

What is believed to be the smallest internal combustion engine of the pure Diesel type has recently been completed by the Fulton Mfg. Co., Erie, Pa. It is a 90-hp. six-cylinder unit and was installed in a boat that will be used by the Government in the vicinity of Wilmington, N. C. A two-stage air compressor located on the forward end of the crankcase supplies the air pressure for starting and for fuel injection. From the compressor the air is led to three steel bottles, one of which is employed to supply the injection air that is led to the injectors located on the top of each cylinder. The surplus air is stored in the other two steel bottles for starting. Individual fuel pumps are provided for each cylinder. In this way if anything should happen to cripple one of the cylinders or the pumps it would be possible for the cylinder affected to be cut out and the engine run on the remaining cylinders. The flywheel is located at the after end of the engine instead of forward, this arrangement, it is pointed out, taking all unnecessary strain off the flywheel. In a test made of the engine it developed 100 b. hp. at a speed of 400 r.p.m. instead of the 90 b. hp. guaranteed. The consumption of fuel oil per brake horsepower per hour at the rated speed of 400 r.p.m. was 0.53 lb. instead of 0.55 lb.

Ashland Steel Output Increasing

The Ashland Iron & Mining Co., Ashland, Ky., expects to blow out its No. 1 furnace, which has been making silvery iron and ferrosilicon, before the middle of the present month. It is the intention of the company to put in a new hearth and tuyere jackets and at the same time arrangements will be made for running basic iron direct into the ladles for transportation to the company's open-hearth steel department. The company has in operation three open-hearth furnaces and will have three additional furnaces ready by Sept. 1. At present billets and slabs are being rolled for the market and sheet bars for the company's sheet mill department. Future plans include the erection of a plate mill and a universal mill.

The San Francisco Shipbuilding Co., San Francisco, Cal., has been organized to build concrete ships. An experimental hull is to be constructed and towed to Hawaii. If the test is successful the hull will be brought back, it is said, and fitted with engines. W. L. Comyn is named as president of the company and Alan MacDonald, chief of construction.

Officials of the Carpenter Steel Co., Reading, Pa., have purchased a controlling interest in the McHose & Co., Inc., Reading Firebrick Works, from William McHose Boyer, president, and Wilson V. McHose, treasurer.

A Mechanically Operated Ladle Stopper

The disadvantages of operating a ladle stopper in the usual manner in present practice are numerous, owing to the extreme heat of the molten metal, its liability to scatter over the operators and other causes. It is apparent that the ladleman and his helper standing on the platform adjacent the molds, occupy dangerous positions, because the gases escaping from the metal while the mold is filling keep the metal in motion and eruption, frequently causing some to fall on the operators. Again, the operators are sometimes fatally burned by the metal escaping from a ladle overturning when a rope, chain, hook or other part of the hoisting mechanism breaks, which is liable to occur at any time. It also occasionally happens after partly emptying the ladle, that the metal violently reacts, the escaping gas throwing the liquid metal to the roof of the building and rendering it extremely dangerous for the operators.

A further serious objection is that not infrequently the stopper will only partially close the nozzle opening, due to imperfect construction, thereby allowing a stream of metal to escape when the nozzle is supposed to have been closed. The nozzle also occasionally breaks, owing to sudden expansion when the hot metal strikes it, causing a leak, so that while the ladle is being conveyed from mold to mold, the metal from a leaky nozzle striking the top edges of the molds, splashes upon the operators and frequently burns them seriously.

To overcome these objections and obviate the necessity of employing ladlemen, George A. Wettengel has devised an improved stopper operating mechanism in

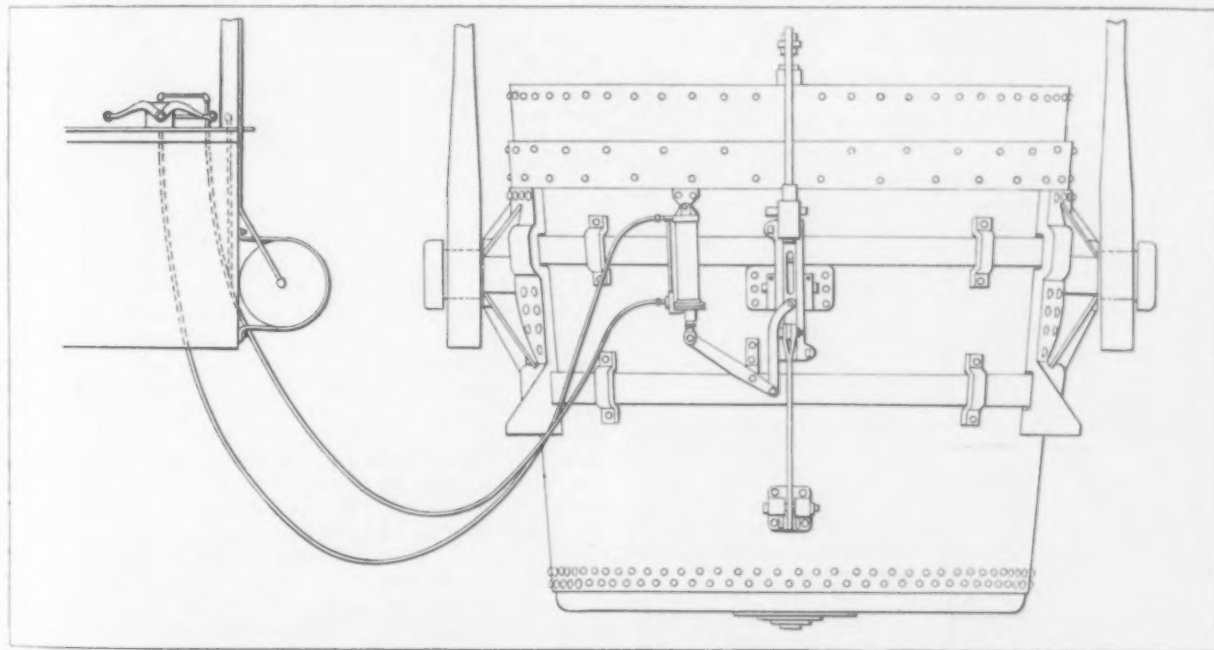
through the nozzle into the mold. When the mold is full the lever is lowered so as to admit air into the opposite end of the cylinder, which lowers the stopper and stops the flow of metal. This is not only a safety device, but it is also a labor saver, no ladleman being required.

Scrap Congestion at Pittsburgh

At a recent meeting in Pittsburgh, called by the Pittsburgh district committee on car service, appointed to consider and decide upon a method of controlling scrap material, representatives were present from the mills, railroads and scrap iron dealers and it developed that a very serious congestion exists in the Pittsburgh district, due largely to uncontrolled shipments of scrap. This condition has become so bad that drastic action at Washington will be necessary, unless the shippers of scrap assist materially.

Eli Joseph, New York, chairman of the Sub-Committee on Scrap Iron and Steel of the American Iron and Steel Institute, has issued a letter calling attention to the conditions at Pittsburgh and adding:

We would therefore ask that you notify all members of the trade through your columns, impressing them with the necessity—first for loading cars to the maximum capacity of the car, or in case of light material, to its visual capacity; second, to ship scrap directly to the consignees, not shipping to themselves or to dealers; third, eliminating the use of order bills of lading in every way possible; fourth, to absolutely discontinue the practice of shipping to intermediate points with a view to reconsigning to some other point when embargoes are lifted or conditions favorable to the shipper



Arrangement of the Pneumatic Apparatus for Mechanically Operating the Ladle Stopper in Pouring Steel

which the operation of the stopper is entirely under the control of the craneman or the pusher, who is always a sufficient distance away to insure his safety.

According to U. S. patent No. 1,207,251, it consists of a mechanical means of raising and lowering the ladle stopper. Secured to the ladle and to one side of the usual stopper mechanism is an air cylinder, as shown by the illustration, the piston rod of which is connected to the sliding plate by means of a link and lever. Mounted in the crane cage is an air valve similar to those used on pneumatic hoists having flexible tube connections to the cylinder and to the air tank. The ends of the tubes have quick detachable hose connections. A tank is attached to the crane and is supplied with air from a motor driven compressor. The operation of the device is as follows:

After the ladle full of molten metal is in place over a mold, the craneman raises the lever of the air valve admitting air under pressure to the cylinder which raises the stopper thus admitting the metal to flow

arise; fifth, to load scrap carefully to avoid rejections, to ascertain carefully the specifications of the mills to which they are shipping and to conform strictly to those specifications, as every reshipment and reconsignment works a great hardship on the railroads.

Mr. Joseph also points out that if the suggestions are not carried out, the railroads will discontinue the practice of reconsigning and their remedy in case of constant rejections and reconsignment will probably be to return the material to points of shipment, if not unloaded in the time allowed.

Col. W. S. Peirce, commandant Springfield Armory, has instituted new methods to stimulate the production and increase the loyalty of employees. Huge wooden clocks have been placed at the entrances of the two plants, the hands of which will mark the daily actual production and the tentative daily production program. Operatives working on piece work will receive medals for increased output.

New Steel Embargo Aimed at Plates

Designed to Bring Japanese Vessels
Into Atlantic Trade for War Purposes—
Shipping Board Takes Over 700 Vessels

WASHINGTON, Aug. 7.—The halting by Presidential order of exports of iron and steel plates, steel billets, pig iron and iron and steel scrap, pending arrangements intended to force Japan to send merchant ships to the Atlantic to help in the work of supplying the Allies, was the salient feature of the past week's war developments. Closely co-ordinated with this project in the program of the United States Shipping Board to beat the submarines is the action of the Emergency Fleet Corporation which on Aug. 3 took over, at a cost to the Government of about \$150,000,000, approximately 700 vessels, aggregating nearly 2,000,000 gross tons, now building in the shipyards of the country for private account. Steps to increase the total number of wooden ships ordered by the Fleet Corporation to not less than 300 have also been taken by Chairman Hurley and Admiral Capps. Altogether the gigantic task of the Shipping Board has received the most powerful impetus given it since its initial program was launched.

Iron and Steel Embargo Aug. 15

A distinct sensation in the diplomatic corps at Washington was caused by the announcement of the instructions given by the President to the Secretary of Commerce for the guidance of the Division of Export Licenses concerning future shipments of iron and steel and explosives, amounting in effect to a hard and fast embargo taking effect Aug. 15. The new rules governing iron and steel shipments, which supersede all previous regulations, are as follows:

First. That all shipments to those nations associated with the United States in the war are, until further instructions, to be licensed freely, without reservations and without restriction, except iron and steel plates, pig iron, iron and steel scrap, and steel billets, for which licenses shall be granted only in case said articles are destined for actual war purposes or will directly contribute thereto.

Second. Licenses which may be properly issued will be granted for shipments of all iron and steel plates and structural shapes and other articles properly included under these general headings under the following conditions only:

(1) The application for such license must be received by the Department of Commerce, Division of Export Licenses, Washington, D. C., on or before Aug. 10, 1917.

(2) Such articles shall be completely made up and manufactured on or before Aug. 10, 1917.

(3) Such license shall be valid, and shall indicate that it is valid, only in case such shipments are covered by railroad or ocean bill of lading dated on or before Aug. 15, 1917.

With respect to the general term "explosives," used in the proclamation of the President on July 9, 1917, the following chemicals are included in its meaning: Ether, alcohol, sulphur, sulphuric acid and its salts, acetone, nitric acid and its salts, derivatives of benzol, phenol (carbolic acid) and its derivatives of toluol, mercury and its salts, ammonia and its salts, glycerine, potash and its salts, all cyanides.

Japanese Vessels Wanted in the Atlantic

While the new regulations with respect to iron and steel products covered by the President's proclamation positively prohibit exportations of these articles after Aug. 15, no secret is made here of the fact that negotiations are now on foot which are expected to result in the relaxation of the new restrictions as soon as a satisfactory agreement can be reached with the Japanese Government. For many months large quantities of structural steel and plates have been exported to Japan for use in shipbuilding, an industry that has had an amazing revival in that country during the past two years. The effect of this activity on the part of Japan promised to be two-fold: First, to absorb a large tonnage of steel shipbuilding materials sorely needed in the United States and, second, to enable Japan to dominate the carrying trade of the Pacific after the war

and ultimately to give it a powerful influence in the trade of the Atlantic.

To meet this situation, diplomatic negotiations were undertaken to induce Japan to send a large tonnage of merchant vessels to the Atlantic to aid in transporting food and war material to the Allies. As these negotiations made but slow progress, the President and his advisers decided on drastic action, cutting off all steel supplies from Japanese ship builders. In order that the action taken by the United States might not present the appearance of a direct discrimination against Japan, the embargo on steel was made broad enough to cover all exports of shipbuilding material, while permitting war munitions free movement as heretofore.

In construing the term "war purposes," used in the President's order, it is authoritatively stated that this designation is not limited to the construction of war ships or the manufacture of any form of war material. The American Government regards it as of vast importance in the conduct of the war that there should be ample transportation facilities available for carrying food and war supplies to England and France; hence, if Japan will furnish a reasonable number of merchant vessels for this purpose, the President will be willing to lift the embargo on steel shipbuilding materials. As a collateral provision, however, the Japanese merchant ships sent to the Atlantic must be furnished under an agreement that the freight rates to be charged by their owners shall be reasonable and on a practical parity with the rates which the Shipping Board intends to enforce in the near future.

Norway Affected Also

The new rules regarding exports of iron and steel will also have an important effect upon the commerce of Norway. That country also has experienced an important revival of ship building since the beginning of the war and, in addition, has been engaged in furnishing large quantities of iron ore, pig iron and other metal products, as well as food, to Germany. The submarine campaign has cut heavily into Norway's trade with the Allies and neutral countries and to-day her merchant marine is said to consist of but 2,000,000 tons of which about 1,000,000 tons is tied up owing to the undersea menace. The American Government now threatens Norway with an absolute embargo on food as well as iron and steel commodities and has pointed out that the only condition under which certain limited amounts of the particular kinds of food needed by the Norwegian people and the very moderate quantity of iron and steel can be secured is that satisfactory pledges shall be given, not only that none of these things shall find their way to Germany, but that they shall not be substituted for Norwegian products exported to the Teutonic allies. In addition, Norway must release for the transatlantic trade all merchant ships now tied up and must guarantee a reasonable scale of freight rates. The Norwegian government has already indicated unofficially its intention to comply with the demands of the United States, the people of Norway facing starvation should this Government place an absolute embargo on food products.

Orders for 700 Ships Taken Over

The action of the Emergency Fleet Corporation in taking over all cargo vessels above 2500 tons capacity now being constructed in American shipyards was foreshadowed by an announcement made by General Goethals some time before his resignation as general manager of the Corporation was tendered to the President. While the Bureau of Navigation has published no figures since Feb. 1 of vessels under construction

in American yards, it is understood that a memorandum supplied to the Shipping Board by the Department of Commerce shows nearly 700 ships in excess of 2500 tons each. The average contract price of these vessels was about \$150 per ton, and as they are on the average about one-half completed the Government will be called upon to pay upon the 2,000,000 gross tons about \$150,000,000. Under the terms of the act creating the Shipping Board the Government will fix the price to be paid, and in the event that it is unsatisfactory the owners will be at liberty to accept 75 per cent of the amount tendered and to bring suit in the United States Court of Claims for the remainder alleged to be due.

Admiral Capps' order does not make it clear whether the Government intends to pay indemnities in any amount for contracts requisitioned upon which no work has been done, but it is probable that claims of this kind will be presented. It is a well-known fact that bare options on deliveries 18 months hence of vessels the keels of which have not yet been laid have recently been sold at handsome advances over the contract price. Hereafter the Government will rule upon every large ship contract for private account, even for repairs, and the entire shipbuilding industry of the country will be directed by the Shipping Board to the one end of speeding up new tonnage for the commerce of the Atlantic and to defeat the object of the submarine campaign.

It is understood that a corps of experts will at once begin a revision of the plans of the ships now under construction which have been taken over under Admiral Capps' order, the purpose being to eliminate all luxurious features and in many cases to remodel passenger vessels so as to make them more available for the carrying of cargos. In addition, the work of construction will be speeded up by doubling or trebling labor shifts and by working overtime where possible. Construction will also be expedited through the work of the Priority Officer of the War Industries Board, who will see that steel and other materials are promptly supplied to the various yards by the most conveniently located plants.

Merchant Ships To Be Taken

It is intimated that within ten days or two weeks the Shipping Board will issue another order, taking over every large merchant ship flying the American flag. Many of these vessels are now in the coastwise trade and will be transferred to the foreign service and operated chiefly between the United States and England and France. Many of them will be used as troop transports and for the conveyance of food and war supplies for the American army on the western front.

A decided impulse has been given to the building of wooden ships as the result of a conference between Chairman Hurley and Admiral Capps and a delegation representing the lumber interests of the country and especially the mill owners of the Pacific Coast and the so-called Southern Pine Association. There will be a substantial increase in the number of these vessels to be built—probably to 300—but it is nevertheless probable that 75 per cent of the big fleet of cargo carriers will be of steel.

Foreign Ships In Coastwise Trade

Administration officials are confidently counting upon an early report on the resolution recently introduced in the House by Representative Alexander at the instance of the Shipping Board authorizing the President to permit vessels of foreign registry to engage in the coastwise trade. Secretary of Commerce Redfield is in receipt of many inquiries concerning the status of the present laws with regard to the privileges of foreign vessels in the American coastwise trade and for the purpose of clearing up all doubtful points in reference thereto has authorized a statement saying that the chief purpose of the resolution is to allow Canadian vessels on the Great Lakes to do coastwise business between American ports.

The Canadian Government very handsomely acted on the matter some time since as concerns us, allowing the coastwise privilege to American vessels in Canadian ports. There is urgent necessity for the employment of all possible tonnage on the Great Lakes in the coal and iron ore hauling.

We need greater freedom in coastwise trade. Suppose for instance a British vessel discharged cargo at Norfolk and

was ordered to Galveston for a cargo of cotton? Suppose also that there was need of coal at Galveston and this vessel could carry a considerable amount and had cargo offered. It could not take that cargo without subjecting itself to heavy penalties as matters now stand. As badly as coal is needed in New England for stocks the vessel could not proceed from Philadelphia to Boston with coal. It could not take lumber for shipyards, or anything else.

The passage of the Alexander resolution will be expedited by its introduction in the Senate before the House has acted, and it is confidently believed the measure will become a law within the next thirty days.

W. L. C.

French National Laboratories for Scientific Research

After a study of the question of the need of national laboratories in France, the special commission appointed for the purpose has made its report. After reviewing what private initiative has done in France and what the government and private enterprise have accomplished in other countries, notably in Great Britain, the United States and Germany, the commission concludes that there is an urgent need in France for the establishment of a national laboratory for scientific research. Such an institution could be placed under the control of the French Academy of Sciences in the same way as the National Physical Laboratory in London is placed under that of the Royal Society.

After hearing the report, the Academy of Sciences has passed a resolution to the effect that the establishment of a National Laboratory for Physical Science and Mechanics is highly desirable, and that it should be specially entrusted with the work of scientific research for the purpose of promoting industry. The resolution contains some hints as to the status, organization and administration of such a laboratory, further details of which are elaborated in the commission's report. As regards financial support for the new institution, the report states that in France it would be useless to wait for the large industrial firms to combine and take the initiative, as they did in Great Britain, and to try to start the laboratory without a Government grant. To ensure a successful start for the institution, about \$20,000 would be required, apportioned among the central institution and its branches.

The Chandler & Farquhar Co. of Boston, a well-known hardware concern, celebrated its thirty-fifth anniversary the evening of Aug. 2. Certificates of insurance were given to employees under the group policy plan of the Massachusetts Savings Bank Life Insurance. The certificates range from \$250 to \$1,000, according to the length of service. A prominent feature of the anniversary was an address on "Women in Business," by Miss Alice H. Grady, financial secretary of the Massachusetts Savings Insurance League.

The American Steel Export Co., Woolworth Building, New York, has issued a 20-page booklet entitled "Export Engineering and Contracting." It describes the facilities which the company has for handling the export problems of American manufacturers. Brief descriptions of the work which the company is prepared to undertake in the construction of industrial plants of all kinds, as well as the exporting of machinery, is touched upon.

The Allentown Standard Mfg. Co., Allentown, Pa., which is building a new factory, has revised its plans so that a three story structure will be erected instead of a two story. The estimated cost will be \$40,000. The company will manufacture sheet specialties and will employ about 400 men. The building will be ready for occupancy about October 15.

It is reported from Winnipeg that deposits of manganese dioxide have been discovered in the Cypress Hills, in southeast Alberta. Already 800,000 tons, worth approximately \$54,000,000, have been blocked out. The product, it is stated, is being sold to the British war office at \$68 per ton.

The Use and Abuse of Steel for Aircraft*

Troubles of British Aeroplane Makers in Obtaining Proper Material—Lack of Heat-Treating Skill—Electric and Crucible Steel—Value of Impact Tests

BY R. K. BAGNALL-WILD AND E. W. BIRCH

WHERE weight-saving is essential, the designer is constantly keeping in mind the necessity for strength combined with lightness and durability; it follows, therefore, taking a typical example, that the quality of steel used in aeroplane and aeroplane engine construction must necessarily receive very close attention. In the earlier days the Royal Aircraft Factory rendered the greatest of services in instituting detailed specifications for aircraft steels. Prior to this date the complete range of alloy steels had not been fully used for parts requiring great strength with a minimum of weight.

In many cases, firms engaged in the construction of aeronautical components had practically no knowledge of the treatment of special alloy steel. As matters progressed it was found from experience that some of the conditions required by the Royal Aircraft Factory specifications had to be altered and improved. Such progress was inevitable with the great increase of output in the earlier stages of the war.

The progress of the various manufacturers was

made to give the same physical test results. Again, it is not generally realized that an alloy steel can be made to give physical tests covering a wide range by variation of heat-treatment.

One question in the choice of a steel by composition is its resistance to abrasive wear. Experience has shown that a relatively high nickel steel does not resist abrasion as well as a low nickel steel with low chromium. On the other hand, the very low nickel, high chromium steel is objectionable owing to its liability to defects in the form of cracks.

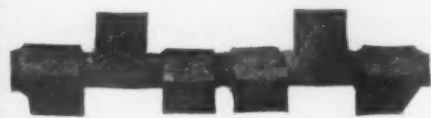
Importance of Heat Treatment

Close touch between the steel maker and the steel user is essential, and lack of this co-operation has led to many costly mistakes. A few degrees in temperature one way or the other may spoil a good steel. It is not sufficient to install a heat-treating plant with the latest type of pyrometer and then sit down and allow a semi-skilled man to do the rest. For instance, a firm recently expressed pride in its heat-treating

Sulphur Print from the Longitudinal Section of a Forged and Stamped Crankshaft



Crankshaft from a Single Width Billet Twisted 120 Degrees



very carefully watched, and every endeavor was made to assist them to promote and encourage developments. The object of this paper is to place on record some of the troubles experienced in the earlier days, and to a certain extent to-day.

A year or so ago very few firms, excepting in the Sheffield district, possessed heat-treating appliances of their own. Many plants have since been built, and this is specially the case in the Birmingham and Coventry districts. It is not, however, sufficient to build a heat-treating plant; it is essential to be able to use it correctly. But it is almost impossible to obtain men with the requisite knowledge. When steels are classified according to their mechanical properties, independent of chemical compositions, each composition requires a different heat treatment. Two steels differing widely in composition may, by different heat treatments, be

plant and pyrometric installation, whereas observation of the interior of the furnace during a heat showed that the temperature was obviously considerably in excess of that recorded by the pyrometer. On examination the pyrometer was found to be incapable of reading higher than 440 deg. C., although the scale extended to over 1000 deg. In pre-war days it was the custom in a number of cases for firms who are now producing aeronautical components, to leave any process which required the steel to be heated in the hands of a foreman blacksmith.

A great deal of delay in production, waste of material and financial loss is undoubtedly caused by want of metallurgical knowledge on the part of some designers. Losses in time and money have also occurred owing to manufacturers not realizing that alloy steels require more careful handling than a carbon steel. For example, the machining of some crankshafts, rough machined prior to heat treatment, was in one instance

*From a paper presented before the Institution of Automobile Engineers (British).



Developed Surface of a Crankpin Showing Fracture and Hair Cracks

very rough and left many jagged edges and sharp corners. On heat treatment, these crankshafts developed serious cracks at 45 deg. to the angle of the web and the axis of the pin. At first the steel was blamed, next the heat treatment, but finally, after a considerable loss in cranks had occurred, the real truth was found out. During heat treatment the cracks started from the rough and jagged edges at the corners of the web and the pin.

Another great source of danger is the design. Designers naturally endeavor to curtail the dimensions of an engine. In one or two cases of engines of the 12-cylinder Vee type, this was effected by the substitution of roller bearings for the ordinary plain bearings.

The cranks were to be made from billets twisted through 120 deg., and the main journal where the twists had to be made was approximately 7/16 in. in length between the webs. It was anticipated that serious damage to the steel would result, since in order to twist the shaft, it had to be raised locally to so high a temperature that subsequent heat treatment could not restore the steel to such a structure as is required to give the physical properties demanded by the specification and desirable for the safety and life of the crank. A number of tests were made on these cranks after final heat treatment, with the following results:

It was next suggested that the cranks should be made from a double width billet so that the twist would not exceed 60 deg. This certainly improved matters, but did not entirely obviate the doubtful structure obtained in the twisted journals.

Various other methods were then tried; cranks were cut from the round, and they were also forged into trifoliate section; the latter is thought to be promising. If it is possible in the design to have, from the steel maker's point of view, a reasonable distance be-



Enlarged View of Hair Crack, 100 Diameters

	Yield Stress, Tons per Sq. In.	Max. Stress, Tons per Sq. In.	Elonga- tion on 1.5 In., Per Cent	Reduction of Area, Per Cent
Straight portion of crank.	{ 56.8 51.3	{ 62.8 56.8	{ 15.3 20.7	{ 42.3 56.2
Twisted portion of crank.	{	{ 53.5 52.5	{ 1.33 1.67	{ 0.28 0.25

tween the webs, it is obvious that some form of pressing from a bar billet gives the most suitable structure in the shaft. The flow of the metal is then continued through the journals, up the webs, along the pins, and so throughout the shaft, as shown by one of the illustrations, but such a form of combined stamping and forging is not possible with the very short main bearing.

A reluctance to heat-treat alloy steels after working used to be prevalent, and the necessity for heat treating after bending, welding or stamping, etc., was not fully recognized. Many firms were quite content to receive stampings as stamped; in some cases they normalized them, but such a process as quenching and tempering was regarded as a luxury or a fad.

Another drawback to progress was the fact that a number of steels were known by certain trade names, and were in fact proprietary articles. They were ordered as such, and no mention of any physical test was made on the order.

A big difficulty had to be overcome where a small steel maker produced a comparatively large output of crucible steel, which as produced was as near perfect as possible. Firms such as this greatly enlarged their plant, introduced the electric furnace, and other modern improvements, but in some cases the increased output was not as satisfactory as the previous small supply; in other words, they had to learn and adopt new methods under difficult conditions.

There is another point which makes steel production difficult in that the raw materials now available are variable. Pig iron (known by trade classification), instead of being uniform in composition as before the war, now may vary within very wide limits. As a result each charge becomes a separate metallurgical problem, and it is only by great skill that a relatively high degree of perfection has been maintained in the high grade alloy steels. Many of the troubles experienced from "hair cracks" are undoubtedly traceable not only back to the ingot, but to the steel making.

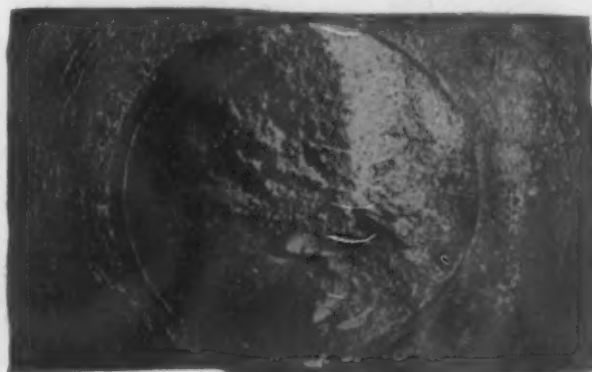
Hair Cracks and the Life of Shafts

Some interesting experiments have recently been carried out with a view to ascertain if crankshafts with hair cracks are dangerous as regards their life.

Assuming in the first place that a crankshaft has only a certain life, it was thought that minor hair cracks, scarcely visible to the eye, should not cause the rejection of a shaft, if it could be proved that such cracks do not develop before the shaft has become worn out, due to stress reversal. With this in view, an engine was tested with a crankshaft which showed certain cracks; it was proposed to run the engine for 100 hours, but the crankshaft broke at 78 hours.

It is certain that hair cracks, although longitudinal, are undesirable, as they form a starting point for circumferential fractures. In many cases the cracks can be traced from end to end of the shaft. There is no definite proof that they open out during a short period of running, but there is evidence that after 50 or 100 hours' work they show signs of developing and in some cases cause fracture of the shafts. Such cracks on a pin running in a white metal bearing must have a disturbing influence on the surface of the white metal. All evidence goes to show that these hair cracks are derived from defects in the ingot.

It is not economical to lay down a definite crop for every type of ingot, or even perhaps individual ingots. Some ingots undoubtedly require more than others. The difficulties may possibly be overcome by insisting on the cranks being forged down from ingots split either into two or four, preferably the latter. The amount of crop necessary, and even the desirability of using the particular ingot, could then be more readily judged. It is noted that the practice of turning blooms all over before cogging down is becoming more



Fracture of a Crankshaft Pin During Straightening Operation

prevalent. This undoubtedly saves wastage at a later date, and eliminates to a great extent surface defects.

The authors are strongly of the opinion that in addition to physical tests, analysis within reasonably wide limits should be specified. There is no doubt that the designer, especially the engine designer, is finding that some steels are more suitable for certain purposes than others. Many steels may satisfy the specification, but differ in chemical composition.

Value of Impact Tests

When the Royal Aircraft Factory introduced an impact test for aircraft steel, very considerable opposition was experienced. Records of tests show that in the earlier days impact test figures were very variable, and this was used as a basis for argument that the impact test as carried out did not give a true representation of the general properties of the steel.

To-day the impact test figures are far more regular, and in steels of a similar composition and tensile figures, from the same firm, the impact results are higher than they were two years ago. A number of experiments have been carried out in the Test House of the Aeronautical Inspection Department and elsewhere, with reference to the introduction of a round Izod test specimen. The results so far obtained have been extremely regular, but this may be argued not to be a sure indication of possible instability in the steel. At the present moment, however, even with the insufficient data available, it is thought that this form of test piece may be accepted in lieu of the square specimen.

The round test piece is suggested as the better, in that it eliminates the difficulty of machining to the standard form now in use. Inaccuracies in the "V" notch are thought to produce variations in the result obtained, but this is not altogether borne out in practice.

It is proposed not only to endeavor to introduce the round Izod test piece, but to allow it to be used with varying diameters. The amount of machining then required would be comparatively small.

A most important point at the moment is output. The steel maker is using every endeavor to produce steel free from roaks, flaws and cracks, but it is a fact that in spite of care, a quantity of faulty steel is delivered to the machine shop, and sometimes a large amount of work is done on it before the defects are found. Detailed inspection can do a great deal to prevent such steel leaving the steel maker; numbers of examples, however, can be put forward showing that much labor in this country is at present being wasted in machining faulty steel.

Steel High in Sulphur and Phosphorus

With regard to bolts required in mild steel, or rather what is so termed in aeronautical manufacture (35 tons ultimate), very great trouble has been experienced in certain directions. A large quantity of steel exists in this country which has a sulphur and phosphorus

content in excess of 0.1 per cent. Such steel is well beloved by the screw maker, it cuts like cheese, does not wear out the dies, and allows a well-cut thread to be produced; on the other hand, it is absolutely dangerous for aeronautical purposes (it is not intended to criticize it for other uses). It is possible to keep down the sulphur and phosphorus content in crank steel to 0.03 per cent, though steel makers have asked a little latitude in this direction, which has been granted, but which it is very gratifying to note, is seldom if ever required. On the other hand, with the milder steels, a latitude for war production purposes of sulphur and phosphorus up to 0.06 per cent has been allowed.

Military specifications for the milder steels formerly did not include an analysis, neither did they include an impact test. It has now been found necessary to include either one or the other. It is obvious that a limit on the chemical content of sulphur and phosphorus will eliminate the dangers attending the use of steel high in these constituents. It is also interesting to note that an impact test of even 15 ft.-lb. on the Izod machine will have the effect of keeping these constituents low. With a percentage in excess of 0.06 practically no impact figure is obtained with this steel as used commercially.

The use of alloy steels for drop stampings has led to many disastrous results. These steels are delicate and require most careful manipulation. The stamper, when using mild steel, ran very little risk of burning it, and experienced no difficulty in making it fill the dies. The chief cause of failure with stampings in alloy steel has been due to the over-heating of the steel. In some cases this can be rectified by heat treatment, but in the majority of cases the stamping is spoiled. Too little attention is given by the stampers to the metallurgical side of the problem.

There is no doubt that in the average engine and aeroplane of to-day—and, the authors think, of tomorrow—air-hardening steel is not as essential as designers imagine. A steel which will give some 70 tons ultimate, with about 17 per cent elongation, will fulfill requirements, provided the designer uses discrimination. A medium nickel alloy steel with moderate chromium, provided the carbon is kept about 0.3 per cent, will satisfy the majority of requirements.

A considerable diversity of opinion exists as to the steel required for gear wheels. There is no doubt that the design of a suitable gear reduction, so as to allow an engine which runs at 2000 r.p.m. to drive an airscrew at 1200 or 1500 r.p.m., presents serious difficulties. Experience has shown so far that the air-hardened gear wheel is liable to pitting and subsequent disintegration, whereas the case-hardened gear does not show these defects. It must be borne in mind that these gears are not running under ordinary conditions. An aero engine must necessarily be of light construction, and therefore nothing is rigid, the crankshaft whips, the crankcase whips, and the whole engine is alive.



An Airplane Engine Cylinder Showing the Tearing of Fins During Machining

The evidence available tends to show that a case-hardened gear wheel is more suitable than the air-hardened one under these special conditions. A very large number of gear wheels have been examined, and although perfectly truly aligned and centered, the wear is not equally distributed along the tooth surface. There is evidence that periodic spot contact instead of line contact takes place.

Another example of trouble is illustrated by one of the illustrations, which shows the fins of an air-cooled aero engine cylinder which have been torn during machining. At one time this resulted in a considerable loss of output, and after careful investigation, the cause of the trouble was found to be due to the manganese content of the steel, which was a straight carbon, being too low. On increasing the manganese no further difficulty was experienced.

Discussion

There was a long and interesting discussion, the steel maker, the steel user and the stamper all being represented. The twist on the crankshaft received some attention, J. H. S. Dickenson quoting experiments in which he had twisted a shaft 120 deg. with 5/16 in. gap as against the 7/16 in. mentioned in the paper. At the same time, narrow gaps were not generally advocated. Dr. Rosenhain favored strengthening steel specifications in the direction of specifying the chemical analysis.

Dr. Hatfield, referring to some sulphur prints exhibited, said that the shape of the ingot was not everything. From the prints one might assume that if the ingot were made slightly broader at the top instead of broader at the bottom, and a refractory head was put on, all difficulties would be overcome. That was not so, and the art of steel making was not by any means as simple as that. Questions to be taken into consideration were the speed with which the steel was poured into the mold, and the casting temperature, i.e., the heat of the metal when it was poured into the mold. Lastly, there was the composition; the amount of silicon, manganese and aluminum. These factors influenced greatly the soundness of the ingots. He pointed them out to show that there was no simple form of specification which would ensure freedom from trouble by the adoption of a certain weight of ingot or a certain amount of cropping.

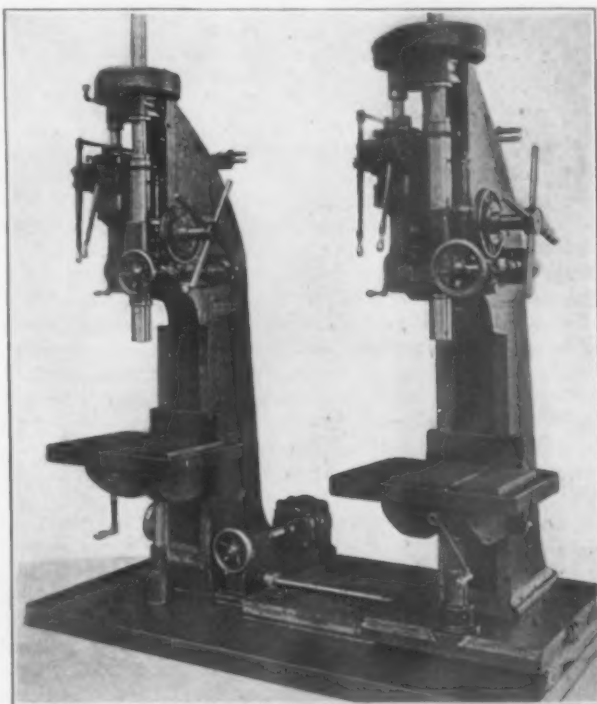
J. H. Brearley was opposed to "analyses within reasonably wide limits" being imposed in the specification. A heat-treatment department could not be expected to produce uniform properties in articles which had been machined from steels of variable and unknown composition. The manager of such a department could produce the best results only if he was able to formulate a treatment and stick to it, and if he had no voice in the matter it was quite time that those who had should bear this important consideration in mind when making their purchases. The easiest and safest of all steels for handling in the heat treatment department were the air-hardening steels, but they were correspondingly difficult for the steel maker and the stamper.

A. E. Berriman referred to an American system of twisting crankshafts in which all the twist came on the pin. He asked for information of the mechanics of the strain that went on during the process of twisting. T. Clarkson asked if the Whitworth process of fluid compression could be applied not only to the ingot but to the casting of the shaft. In that way a good deal of the subsequent work upon it would be avoided. He threw it out as a suggestion for solving one of the difficulties in connection with latent flaws.

The Charles A. Schieren Co., New York, has completed additions to its tannery at Bristol, Tenn., and work will be begun immediately to increase the company's output of leather belting. A working force sufficient to produce 24,000 lineal ft. of belting daily will be employed at the start and added to as rapidly as skilled help can be found until the full capacity of the plant, 50,000 ft. daily, is reached. This plant has been built to take care of a growing trade in the South.

A Double Spindle Axle Drilling Machine

A two spindle axle drilling machine, designed for the simultaneous drilling of both ends of the front axles of automobiles, has been brought out by Baker



Both Ends of a Front Automobile Axle Are Drilled Simultaneously, the Machine at the Right Having an Adjustment of 25 in. to Take Care of Variations in the Length

Bros., Toledo, Ohio. This machine consists of two units of the firm's No. 314 standard single spindle high speed drill mounted on a longer bed than the single spindle machine.

One machine is stationary on the bed, and the other adjustable unit at the right is held on a gibbed way and its movement is controlled by a square threaded screw that turns in a stationary nut, the screw being driven through a worm and worm gear from the armature shaft of a 1½-hp. motor located at the side of the stationary machine, as shown in the illustration.

The right hand machine moves 25 in. on its ways and the two drill spindles can be placed on a range of 35 to 60 in. centers. Each unit is driven independently from an overhead countershaft. The machine is designed to drive a 3-in. high speed drill to capacity. It has six speed changes and 12 feed changes. The distance from the center of the spindle to the face of the frame is 12¼ in.

Considering Price Control

The Merchants and Manufacturers' Association, Baltimore, Md., Robert J. Beacham, secretary, is expected to take action in the matter of Government control of prices of raw materials. The association has asked its members to express their opinion as to whether it should act on the question and what position it should take. "Should it openly advocate Government price control of all the primary elements of raw materials which enter into American manufactures, or should it advocate only the limitation of that control to such activities as will cut out the fictitious values due directly and exclusively to speculation?" it asks.

The association also wants to know how far the policy of price-fixing by the Government should be permitted to interfere with a seller's right to dispose of any commodities of raw material at a premium, if such sale involves a sale of special value or advantage to the buyer for which he is willing to pay.

The American Machine & Mfg. Co., Atlanta, Ga., announces that it will begin operating its new steel foundry with a capacity of 10 tons of finished steel castings per day on Sept. 1.

Role of Silicon in Steel Making*

Its General Effect an Indirect One —Influence on Mechanical Properties—Silicon Magnetic Steel

BY W. E. RUDER

FOR many years after Mushet found that quartz sand, when added to molten iron, produced a product that was hard and brittle, the presence of silicon in steel was looked upon with suspicion and distrust. Even to-day there are undoubtedly many metallurgists who would be very slow to specify even small percentages of this element for most grades of steel.

Less than 30 years ago, however, the researches of Barrett, Brown and Hadfield gave to silicon a place as a useful alloying element with iron, which has not since been usurped or even approached by any other element. It is true that in this country, some years before this, small percentages of silicon had been found useful to reduce magnetic aging of mild steels used in the construction of magnetic circuits, but the percentage was so small that it could scarcely be classed as an alloy steel.

The effect of small percentages of silicon, such as are met with in carefully made steel from any process, upon the mechanical properties has been carefully investigated by many authorities and it is the general concert of opinion that its effect is negligible. Where it has been found in proportions exceeding 0.1 per cent and poor results obtained, such results are usually traceable to accident or lack of care in manipulation during the process of manufacture.

Silicon and Mechanical Properties

In most of the investigations carried on by prominent investigators, the effect of silicon, particularly in amounts less than 1 per cent, have been masked or modified by the presence of varying percentages of manganese and carbon. In a recent paper Yensen has re-examined the series of forgeable silicon alloys, using as a base pure electrolytic iron and giving us a more exact idea of the effect of silicon alone. Although his figures differ in some cases from those found by previous investigators the general trend of his curves is the same.

Silicon increases the tensile strength of pure iron from 38,000 to about 90,000 lb. per sq. in. at 4 per cent in annealed samples. Beyond this point the value rapidly falls off. The elastic limit is likewise steadily increased up to 4 per cent silicon. The ultimate elongation and reduction of area are practically unaffected until 2.5 per cent of silicon is reached. From this point the drop is rapid.

It is interesting to note that whereas Yensen's values for elastic limit and ultimate strength are generally lower than those of previous investigators, his values for reduction of area and ultimate elongation are in general higher, particularly for silicon content below 2.5 per cent. This would indicate that silicon in itself does not cause brittleness when below 2.5 per cent, and that the presence of small percentages of carbon increase the strength at some sacrifice of ductility. The decrease in ductility is about coincident with the beginning of the marked tendency for large grain growth which silicon imparts to mild steel and with the beginning of the precipitation of graphite.

Although the limit of forgeability is given as about 7 per cent of silicon, the practical limit for sheet rolling is something under 5 per cent.

An interesting new development in the study of iron-silicon alloys is noted in Yensen's work in which he appears to have established a heretofore unnoticed critical point at which there is a sudden drop in all mechanical values at about 2.5 per cent of silicon. The

phenomenon was first noticed from the fact that two ingots in this range broke up in forging. A further examination showed that there was a sharp drop in all values at 2.5 per cent and an equally sharp recovery at 2.7 per cent of silicon. The formation of a compound Fe_{10}Si is suggested as an explanation but seems hardly adequate. However, no satisfactory explanation has yet been arrived at.

Silicon and the Critical Points

Gumlich has shown that the second magnetic transition point is steadily lowered with increased silicon content until it reaches a value of about 660 deg. C. for 8.35 per cent silicon, while the first (pearlitic) point steadily rises, the two coinciding at 2.2 per cent silicon, and becomes practically extinct at 2.5 per cent silicon. In an exhaustive study Charpy and Cornu-Thenard later confirmed this observation and definitely connected the disappearance of the A_1 point with the precipitation of graphite.

Silicon forms a solid solution with iron in all proportions up to about 20 per cent of silicon and since this is far beyond the region of present usefulness it is unnecessary to discuss, at this time, the iron-silicon diagram.

Silicon and Magnetic Properties

Just as tungsten, chromium, nickel and manganese have found their specific uses when alloyed with iron, so also silicon quickly found its place as an alloy for magnetic circuit for alternating fields. Although carbon steels containing from 0.2 to 0.4 per cent of silicon are made for tires and automobile springs, and certain tool and gun steels are reported to have from 0.3 to 0.6 per cent of silicon, the almost exclusive use of silicon alloys is for magnetic circuits. Something over 100,000 tons of silicon alloy sheets were used in this country alone during the past year.

Silicon raises the resistivity of mild steels about 10 microhms per cubic centimeter for each per cent added, so that a silicon steel containing 4.5 per cent of silicon has a resistivity of 59 microhms per cubic centimeter. This has an important effect in reducing the eddy current losses.

Gumlich found that the coercive force was very greatly improved by the addition of 0.06 per cent of silicon in both rods and sheets. This improvement continued in the sheets, reaching its lowest value at 0.4 per cent of silicon and thereafter rising. In rods, however, there is an immediate rise up to 1 per cent of silicon, and then a gradual falling off.

Yensen, on the other hand, working with very pure alloys in the shape of rods only, finds two minimum points of equal value, one at 0.15 per cent silicon and one at about 4 per cent. In maximum permeability there is fair agreement as to the shape of the curve, that is, each shows two maximum values at about 0.2 and 3.5 per cent respectively, although their numerical values differ very greatly. In this case, however, we are comparing Yensen's rods with Gumlich's sheets. From his rods the latter gets widely different and unexplained results.

The explanation of the wide difference which Gumlich finds between sheets and rods and the agreement in the shape of his curves for sheets with those of Yensen's rods probably lies in the fact that the former's sample contained from 0.18 to 0.34 per cent of carbon. This carbon remained in the combined form for the rods under 2 per cent silicon, while in the sheets it precipitated out as graphite, this graphitization being aided in this case by the freer access of oxygen during

*From a paper presented at the Twentieth Annual Meeting of the American Society for Testing Materials, Atlantic City, N. J., June 27, 1917. The author is in the research department of the General Electric Co., Schenectady, N. Y.

the annealing and possibly by the fact that it had more severe mechanical working.

Effect of Silicon an Indirect One

The effect of silicon, therefore, seems to be, unlike that of the ferromagnetic metal cobalt, an indirect one. Its first effect is to act as a deoxidizer, its presence in small percentages indicating its excess over the amount of removable oxygen originally present, and therefore explaining the first peak in permeability curve and depression in hysteresis value. From this point on to about 2 to 2.5 per cent, the silicon merely acts as a diluent causing a steady drop in saturation value and permeability and an increase in coercive force. At about 2 per cent, however, its influence as a grain growth stimulator becomes evident (Hadfield) and there is a consequent rise in permeability and decrease in coercive force. This effect reaches a maximum and from this point onward any added silicon again acts as a mere diluent.

In some recent unfinished experiments I have gathered some evidence that hydrogen appears to form an alloy with iron producing much the same effect on the maximum permeability and saturation value. This alloy, however, appears to be stable only at low temperatures.

The increased solvent power for gases imparted by the silicon and the decreased solvent power for carbon are also undoubtedly large factors where these are present. In commercial silicon steel these properties are of the utmost importance. Charpy and Cornu-Thenard have shown that a 3.9 per cent silicon steel containing 0.14 per cent of carbon had its carbon completely separated out as graphite after an annealing of three hours at 800 deg. C. This graphitization accounts in part for the second maximum point, particularly in alloys containing over 0.1 per cent of carbon.

Effect of Grain Size

The effect of grain size on the two components of total watt loss, namely, hysteresis and eddy currents, and upon the permeability, is interesting and the reason is not altogether clear. Increased grain size causes a decrease in hysteresis and an increase in permeability at medium and low densities. The eddy current losses increase with the grain size but apparently not in as direct a ratio as the decrease in hysteresis. From recent data, this increased permeability seems to be due to a higher permeability in the direction of crystal orientation and the high eddy loss to a consequent non-uniform permeability in the cross-section tested.

Heretofore it has been considered that the resistivity of the material and the thickness of laminations was the sole factor governing the eddy current losses, but I have found many cases where the eddy current losses have been doubled with increased grain size without change in resistivity or thickness in lamination.

Increased grain size in the direction of rolling also accounts for the increased permeability and decrease in watt loss of silicon steel when tested in sheets cut parallel to the direction of rolling when compared with those cut across.

Other elements as tin and arsenic have been shown (Burgess & Aston) to have similar effects upon magnetic properties of iron, but none of them combines all of the beneficial effects of deoxidation, graphitization, increased grain size, increased electrical resistance and solvent power imparted by silicon.

Newman Erb, president of the British Columbia Copper Co., 42 Broadway, New York, has begun suit against the Bettendorf Co., Bettendorf, Iowa, manufacturer of cars and railroad equipment, for \$2,681,480, alleged to be due to him on a contract with the Russian Government. Mr. Erb sets forth in his bill of complaint that he obtained a contract from a commission known as the Direction of Railways of the Imperial Russian Government for 4000 gondola cars of 40 tons each, and subsequently made a contract, he claims, with the Bettendorf Co. to build these at \$1,436.30 each. It is charged that the defendant failed to carry out the contract.

GUNS FOR ARMY

Surmise in Regard to Large Appropriations Asked by Secretary McAdoo

WASHINGTON, Aug. 6. — The largest item in the latest estimates submitted by Secretary McAdoo and referred to in THE IRON AGE of Aug. 2, calls for \$2,468,613,000 for "armament of fortifications." This demand came upon Congress like lightning from a clear sky. The amount is more than has been spent upon coast and harbor fortifications in the past 20 years and the fact is being emphasized here that the Chief of Engineers of the Army in his annual report, submitted to Congress last December, stated that our seacoast fortifications were satisfactory so far as attack from the sea was concerned and only needed protection against aerial attacks or assaults from the rear. It is well known that the Ordnance Bureau has contemplated the strengthening of the fortifications with 17-in. guns at a few points along the coast, but it has been the freely expressed opinion of ordnance experts that no advance in marine gunnery has been made that would render our coast defenses vulnerable. It will be surmised in well informed quarters that a large part of this appropriation will be utilized in providing artillery for the new national army. Under a rule of the House, ordnance items to be considered by the Committee on Appropriations are usually classified as "armament of fortifications" for the reason that the committee originates the annual fortifications bill while other ordnance items are handled by the Committee on Military Affairs. The form in which these estimates are presented encourages the belief that the Congressional leaders are now prepared to relax many of the restrictions heretofore imposed on the expenditure of appropriations for war material.

Sharon Steel Hoop Co. Extensions

The Sharon Steel Hoop Co., Sharon, Pa., as noted briefly on page 222 of THE IRON AGE of July 26, will make some large extensions to its Youngstown Iron & Steel Co. plant. Severn P. Ker, president, states that the extensions consist of the addition of two new 75-ton basic open-hearth furnaces, these being exact duplicates of the four furnaces now in operation at that plant, also one 4-hole soaking pit, duplicating its present three 4-hole soaking pits, and also the addition to the electrical power equipment of a reversing motor and motor generator set to drive what is now a three-high universal slabbing mill, but after installation of the new power, will be changed to a two-high universal slabbing mill. The electrical equipment to be added is a typical reversing set with motor generator fly wheel set, and the contract for all the electrical equipment has been given to the Westinghouse Electric & Mfg. Co., but so far no other contracts have been placed. No additions to the finishing mill capacity in the Youngstown Iron & Steel Co. mills are included in this program, or contemplated in the near future.

A New Grinding Wheel for Munitions Plants

A grinding wheel in which the grains of the abrasive are welded together has been brought out by the White Heat Products Co., Frazer, Pa. Among the advantages claimed for the wheel are a faster cutting speed and a longer life, together with the generation of less heat when cutting tool steel. The wheels are made by a secret process from bauxite. It is stated that wheels can be made from the raw material to the finished product in 48 hr., a feature which enables deliveries to be made quickly on orders for special wheels.

The American Ship Building Co., Cleveland, will launch a new freighter, building for M. A. Hanna Co., from its Lorain, Ohio, yards, Aug. 11. The vessel will be named the Carmi A. Thompson, after the former Secretary of State of Ohio who is now identified with the Great Northern ore properties.

Light versus Heavy Reductions in Cold Working Brass*

In a paper entitled "An Investigation Leading to Specifications for Brass Condenser Tubes," by Prof. A. E. White, delivered at the last annual meeting of this society, the statement was made that: "It is likewise more desirable to reduce the thickness of the tube by many light drafts than by a few heavy drafts. Such procedure guarantees more thorough and uniform kneading and interlocking of the tube grains."

In the discussion the writer called attention to the fact that no evidence was presented in support of this statement, and that it was contrary to established practice. The proper degree of reduction is later defined by Professor White as one "which should only be just heavy enough to work the metal all the way through" without defining any method of determining what constitutes that degree. It is quite certain that experienced brass workers could not make such a determination. It is felt by the writer that if there was a difference in results obtained by a series of relatively light passes as compared with one heavy pass effecting the same total reduction, the fact could readily be determined. In order to obtain some data on the subject, the following experiments were performed.

A sample of cartridge metal was rolled down to approximately 0.200 in. thick and very carefully annealed. This sample was then cut into two pieces. Sample No. 1 was rolled to 0.098 in. thick in one pass, while sample No. 2 was rolled to precisely the same thickness in six passes. From each piece three test samples were cut and submitted to physical test with the results shown in Table 1. A microscopic examination was also made. It is evident from both the physical tests and microscopic examination that the only difference between the material which was given six passes and that which was given but one pass is that the latter has a higher tensile strength and slightly lower elongation.

TABLE 1—TESTS OF ROLLED CARTRIDGE METAL

Sample No.	Tensile Strength, Lb. per Sq. In.	Elongation in 4 In., Per Cent
One pass).....	79,130	5.0
	79,760	4.25
	77,770	5.0
Average	78,890	4.75
2 (Six passes).....	77,420	4.75
	77,870	5.25
	78,340	4.75
Average	77,880	4.92

As a further check on this experiment a sample of high brass rod containing a small percentage of lead was drawn to $\frac{1}{2}$ in., carefully annealed and treated precisely as in the preceding case, except that a reduction of 50 per cent was effected in one sample by one draft through a die, while a similar reduction was effected on the other rod by five successive passes. The results of physical tests are shown in Table 2.

It is certain that nothing indicates that any superiority is possessed by the samples from material reduced in several passes, over that reduced in one pass.

Upon examination of the ends of the rods after drawing it was found that those passing last through the die were cupped because of the greater flow of metal near the surface, and that the cup in the rod having five passes was much deeper than in the other case. It is this uneven flow which produces the internal strains which cause season cracking. It was therefore

TABLE 2—TESTS OF DRAWN BRASS ROD

Sample No.	Tensile Strength, Lb. per Sq. In.	Elongation in 4 In., Per Cent
1 (One pass).....	94,450	4.25
	94,300	4.25
Average	94,380	4.25
2 (Five passes).....	93,700	4.25
	93,450	4.25
Average	93,580	4.25

*From a paper presented at the twentieth annual meeting of the American Society for Testing Materials, Atlantic City, June 26 to 29, 1917. The author, W. Reuben Webster, is general superintendent, Bridgeport Brass Co., Bridgeport, Conn.

decided to investigate this phenomenon further. A rod of high brass, free from lead, was extruded and drawn to 1 15/16 in. diameter and carefully annealed. One portion of it was drawn to 1.415 in. in diameter in one pass and an adjacent portion to the same diameter in five passes. Prior to drawing, the ends of the rods were accurately squared up in the lathe.

It is planned to investigate the relative intensity of the internal strains in these two rods and report the results obtained later. A careful microscopic examination was made of each rod but no differences could be detected.

While these experiments cannot be considered as conclusively demonstrating the falsity of the statement quoted at the opening of this paper, at the same time they are better evidence than any evidence that has been presented in support of its truth. It is therefore felt that it is not yet necessary to abandon the existing methods of working brass in favor of that recommended by Professor White.

Cement Joints for Cast-Iron Water Mains

At Long Beach, N. Y., there are 60 miles of cast-iron water mains, varying from 4 to 24 in. in diameter, and laid with cement joints. They are all under pressures ranging from 40 to 80 lb. per sq. in. Charles H. Shaw, in a recent paper before the American Society of Civil Engineers, described the method of making these joints.

The author recommends the use of dry jute, free from oil or grease, instead of oakum for the foundation ring. The Portland cement is to be placed dry on a piece of canvas (a torn sack) under the joint and to be moistened and mixed to such a consistency that when gripped firmly in the hand the paste should retain its form but crumble if dropped from a height of 12 in. The paste is then to be hand-packed into the joint and to be hand-rammed with a caulking tool until the socket is half full. The joint is then to be filled and caulked with an iron tool and heavy blows with a hand hammer, until the cement is thoroughly packed, and the packing to be continued till the joint is nearly full. A small bead of neat cement in plastic condition is then put on, using the caulking tool for smoothing like a trowel. After the cement has set the joint is to be covered with earth so as to protect it from the air and sun. The back filling of the excavated material is to be settled with water. About 20 per cent of the cement is generally wasted. The joint is allowed to stand 48 hours before the pressure is turned on.

It is stated that such cement joints will stand a great deal of rough treatment and that settlements to the extent of 3 in. and more have occurred without destroying the seal. As regards cost, according to the written communication of another member, a cement joint is cheaper than a lead joint but more expensive than one made up with "leadite."

Steam Turbine for Boiler Feed Pumps

For driving boiler feed and circulating pumps, fans and blowers the General Electric Co., Schenectady, N. Y., has developed a steam turbine of the impulse type. A wide range of capacities is covered, the number of stages and rows of buckets being dependent upon the capacity of the unit. The wheel casing is of the split type and is lagged with planished iron. In this way, it is pointed out, the buckets which are of bronze, dovetailed into the rim of the wheel, can be readily inspected. A constant running speed is maintained by a governor mounted directly on the shaft and controlling a double balance piston valve type throttle. A hand-wheel adjustment provides for changes in speed while the turbine is in operation. The rigid frame of the turbine is supported by three feet which are relied upon to keep the bearings in line at all times, and the main shaft carrying the turbine and governor runs on bab-bitted bearings with a renewable lining.

Molybdenum is found in the Siamese Malay States and at Chantaburi, on the east coast of the mainland of Siam.

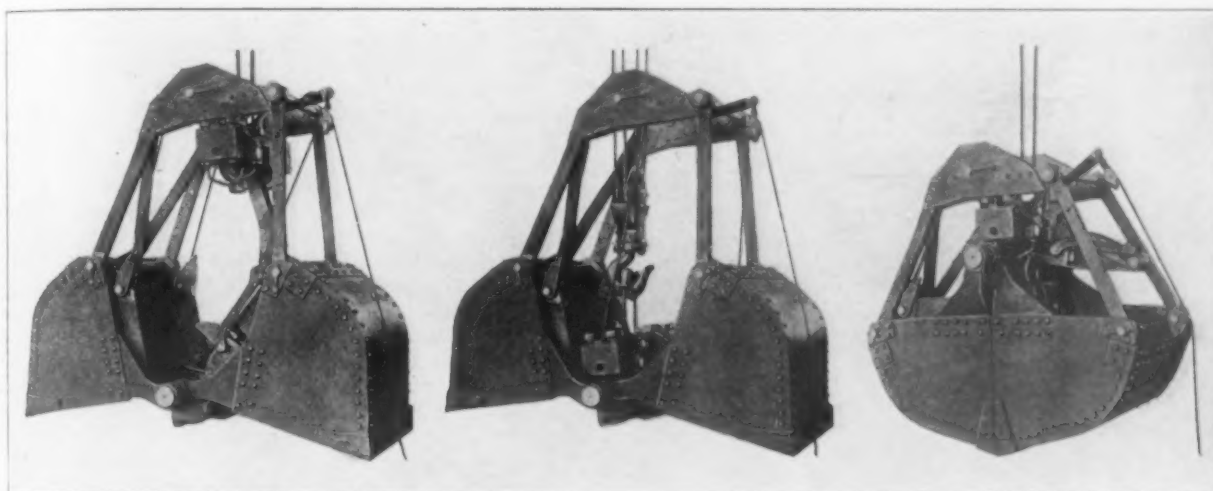
New York Interests Buy Bon Air Plant

The Bon Air Coal & Iron Corporation will be organized with a capital of \$10,000,000 to take over the Bon Air Coal & Iron Co.'s properties at Allen's Creek, Eastland, Bon Air and Ravenscroft, Tenn., which have been in receivers' hands for seven years. The new company will improve the two stacks and six Gordon hot-blast stoves which the old company operated at Allen's Creek and will add two more stoves, increasing the output to 200 tons a day. At Eastland the company had 200 beehive ovens which produced 80,000 tons of coke a year. The coal mines of the corporation are located at Bon Air, Ravenscroft and Eastland, and it is the purpose of the new owners to increase the output of coal to 10,000 tons a day. Included in the purchase are 27,000 acres of timber land in Wayne County, Tenn., and this property is reported to contain rich iron deposits which will be developed later. The officers of the Bon Air Coal & Iron Corporation are Alex. R. Peacock, New York, president; W. J. Cummins, Nashville, vice-president; A. J. Moreland, Pittsburgh, secretary and general manager; John McE. Bowman, New York, treasurer and chairman. Mr. Peacock was formerly vice-president and sales manager of the Carnegie

A Single Hoist Type of Grab Bucket

As a substitute for the double hoist or two-line grab bucket, Edgar E. Brosius, Pittsburgh, has brought out an automatic single hoist type. The bucket is designed for use in iron and steel foundries, rolling mills and industrial plants. Among the advantages claimed for the bucket are that it can be attached to any crane or hoist by simply throwing the hook block of the bucket over the hook of the crane, operates in limited headroom and trips by hand line from the operator's cage or ground without any shock to the crane or bucket.

In the open position the hook block is lowered until the cross-head of the bucket comes all the way down and allows the latch to engage. The hook is then hoisted until the bucket is closed, and the load raised. When it is desired to dump the bucket the hand line is pulled either from the operator's cage or the ground. This releases the latch which holds the two sections of the bucket together, thus permitting the bottom scoops to fall open again. The shock of opening is absorbed by causing the bucket to climb its own hoisting cable, an arrangement which is relied upon to permit the bucket to drop open easily without jar either to itself or the crane.



The Movement of the Hook Block Controls the Opening and Closing of a Single Hoist Grab Bucket

Steel Co., and Mr. Moreland was once connected with the same company. Mr. Bowman is a leading New York hotel man, interested in the Biltmore, Manhattan and Commodore hotels.

Large Lake Ore Shipments in July

Shipments of iron ore from the Lake Superior region in July this year broke the record for the same month last year by 5.04 per cent or 491,476 gross tons. The total was 10,241,633 tons against 9,750,157 tons in July, 1916, the record month at that time. The totals by ports, with season shipments and a comparison with 1916, are given below:

Port	July, 1917	July, 1916	To Aug. 1, 1917	To Aug. 1, 1916
Escanaba	932,274	1,044,368	3,137,571	3,647,192
Marquette	643,887	680,779	1,269,636	1,834,919
Ashland	1,238,326	1,302,682	3,147,794	3,506,945
Superior	2,231,502	1,986,631	5,757,584	5,865,546
Duluth	3,543,873	3,012,492	8,672,767	9,338,482
Two Harbors...	1,651,771	1,723,205	4,391,416	5,172,640
Total	10,241,633	9,750,157	26,376,768	29,365,724
1917 increase	491,476			
1917 decrease			2,988,956	

The season's shipments to Aug. 1 are less than those for last year by 10.17 per cent. The Duluth percentage of this total is 32.88 per cent against 31.80 per cent last year, while that for the Great Northern also reveals an increase of 18.09 per cent this year against 17.50 per cent last year.

The Alexander Milburn Co., Baltimore, Md., manufacturer of lighting and welding apparatus for industrial plants, has opened a New York office at 51 East Forty-second Street in charge of W. F. Barnwell.

The bucket is used in rolling mills for removing roll scale from the pit, as well as handling miscellaneous material around the plant. In industrial plants the bucket has been installed on locomotive cranes for handling stock material at irregular intervals. When used for this purpose it is pointed out that it is not necessary to change from the fall block to the ordinary two-line bucket which keeps the crane out of commission from 1 to 3 hr. every time the change is made.

Natural Gas Prices Advance

The Pittsburgh and West Virginia Gas Co., supplying towns in Harrison, Lewis, Marion, Monongahela, Taylor, Tyler and Wetzell counties, has made application to the public service commission for permission to increase its rates on natural gas supplied to industrial concerns. The company now charges 22c. per 1000 cu. ft. for 150,000 ft., 17c. for the second 150,000 and 11c. a thousand for all over 300,000. The application is to establish a rate of 22c. per 1000 for all gas up to 500,000 cu. ft. and 16c. per 1000 for all over that quantity. It would also raise the rate to schools, public buildings, hospitals and churches from 16c. to 19c. per 1000 ft. The present rate of 23c. per 1000 for domestic use would stand.

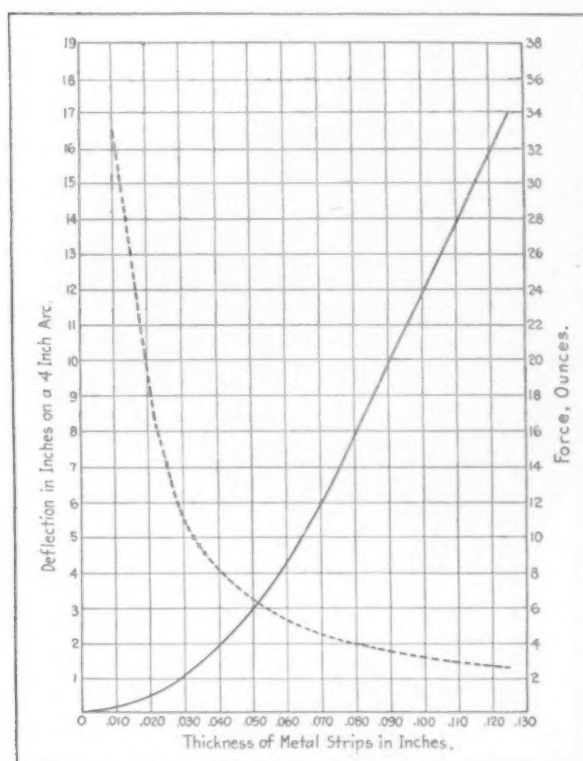
C. W. Leavitt & Co., 30 Church Street, New York, as buying agents for foreign clients, will be interested to receive catalogs and quotations for export on oil and tar heater furnaces for tempering and annealing steel as well as on furnaces for hardening tools of high-speed steel, on pyrometers and other apparatus useful in producing high-grade steel.

A NEW THERMOSTATIC METAL

Curves or Regains Its Straightness as the Temperature Rises or Falls

A NEW metal, known as G-E Thermostatic Metal, which takes a curve or regains its original straightness in accordance with well defined laws as the temperature rises or falls, has recently appeared. It is the product of the General Electric Co., Schenectady, N. Y. As a result of this responsiveness to temperature change and the mechanical force developed, this metal is used to actuate various mechanisms which tend to neutralize either the temperature change or its effect upon devices.

The new metal consists of two strong non-corrosive metals possessing a wide difference in coefficients of expansion, the widest difference possible for any known stable combination of metals. These two metals are firmly attached to each other throughout their entire length so that there is no slip of the one upon the other.



The Dotted Curve Shows That the Deflection per Degree of Temperature Is a Constant for Any Definite Piece of the Thermostatic Metal. The other curve shows that a piece of the metal, 1/10 in. thick by 5/16 in. wide by 4 in. long, on being restrained from bending when subjected to a temperature change of 100 deg. Fahr. will exert a force of 24 oz. or 1½ lb.

Thermostatic metal can be cut, stamped or pressed into practically any desired shape and when annealed will have all its original inherent qualities. It will not deteriorate nor take permanent set under applications of heat or force within definite practical limits, according to the claims of its originators. The metal is manufactured in various standard thicknesses ranging from 0.25 to 0.015 in. with a maximum width of 4 in. and a maximum length of 36 in.

As an indicator this metal is regarded as remarkable in that it can be used for temperatures as high as 500 deg. Fahr. The deflection per degree of temperature change, besides being quite considerable, as shown by the dotted curve in the illustration, is a constant for any definite piece of the metal. Since a definite and considerable opposing force is necessary to cause the metal to take permanent set, the metal can be depended upon when used in devices where extreme accuracy is required.

If the curving of this thermostatic metal on heating or cooling is opposed, the metal will produce a mechanical force, which is limited only by the force required to produce permanent set. For example, the

pull line curve, in the illustration, shows that a piece of thermostatic metal 1/10 in. thick, 5/16 in. wide and 4 in. long will exert a force of 24 oz. (1½ lb.) on being restrained from bending when subjected to a temperature change of 100 deg. Fahr. This curve illustrates the laws that the force exerted by this metal varies as the square of the thickness, directly as the width and as the square of the temperature.

The deflection for any given temperature change varies directly as the square of the length of the piece of thermostatic metal and inversely as the thickness of the piece. As previously pointed out the deflection of any piece of metal varies directly as the temperature change.

G-E thermostatic metal is used in the products of many different industries owing to the fact that it can be successfully worked into different shapes and forms. In some of its applications it is used to actuate mechanism directly by means of the force developed within itself when its tendency toward assuming a curved shape is restrained. In other applications it is used to close and open the contacts of electrical circuits by means of which various devices are operated.

It has possibilities in carburetor manufacture, in automatically controlling the richness of the mixture as the temperature changes; in scales, balances and other scientific instruments in compensating for errors due to temperature changes; in furnaces, incubators and refrigerators for controlling the temperature. In these latter applications the non-corrosive characteristics of the metal are to its advantage.

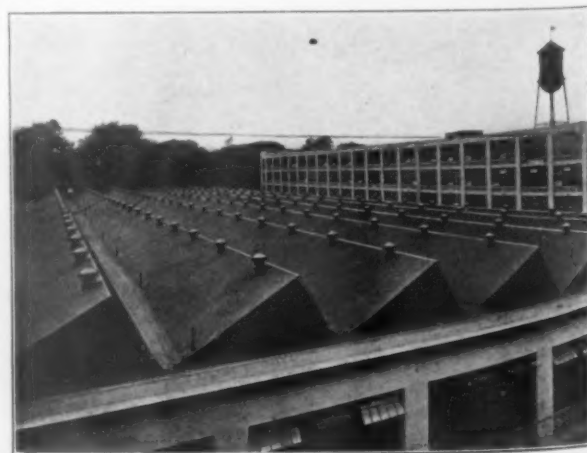
The reliability of this metal has merited its use in thermometers and has gained consideration for it as a compensating device in watch balances, and it is but a step forward to see it used in the proverbially accurate ship's chronometer.

Thermostatic metal is a product of the Fort Wayne, Ind., Works of the General Electric Company where the desirability of a metal with its characteristics arose from necessities in the construction of certain types of electric meters. This metal met the requirements so fully that manufacturers who had thermostatic and heat compensation problems adopted it as a matter of course.

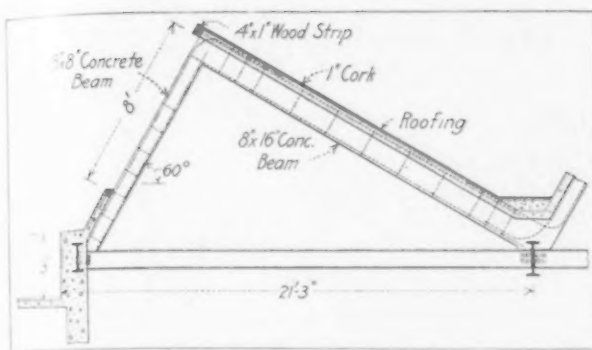
Sawtooth Roof for Firearms Plant

A one-story addition to the plant of the Colt's Patent Fire Arms Co. has recently been completed by the Aberthaw Construction Co., Boston. A four-story factory was built last fall, but the increase in orders for army revolvers has made necessary the addition of nearly 3 acres of floor space.

The addition is covered by a sawtooth roof running lengthwise of the building so that the glass area is exposed to a north light. The framing is structural steel supported on round steel columns, the bay spacings being about 21 ft. each way. The outside columns and the floor are of reinforced concrete and heavy reinforcement was necessary in the latter on account of bad ground conditions. Some 260 tons of structural



Sawtooth Roof Covering a Recent Addition to the Colt Fire Arms Plant Which Is Protected by a High Woven Wire Fence and Barb Wire



A Typical Section of the Roof

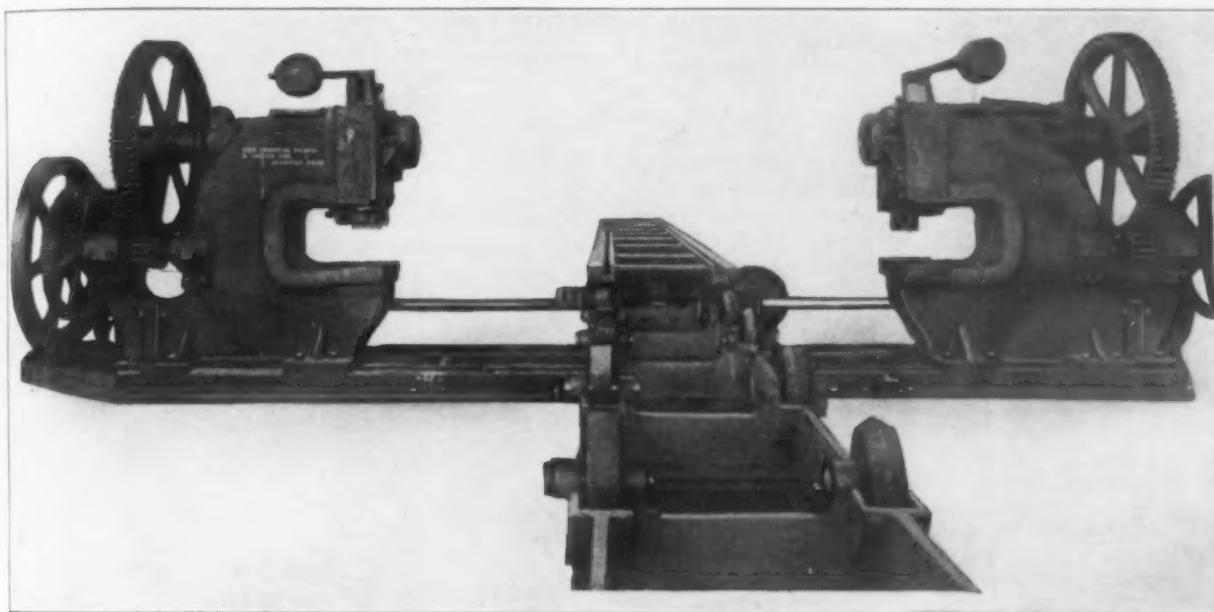
steel and 350 tons of reinforcing steel were employed. The sidewalls of the building are equipped with steel sash of the Fenestra type, over 10,000 sq. ft. being installed.

Large Double Plate Punching Machine

The Ironton Punch & Shear Co., Ironton, Ohio, has just completed for the Jones & Laughlin Steel Co. a large double punching machine. It has some features which are said by the manufacturers to be different from anything of the kind heretofore built. The machine in reality is a double punching machine, each one arranged to punch in unison a 1½-in. hole through 1½-in. soft steel plates.

Each machine is mounted on a bedplate and can be adjusted so that centers ranging from 5 to 14 ft. can be obtained. The shaft shown in the center drives both machines through gears and its revolutions automatically space the work to be punched. Power for the shaft is supplied by a 20-hp. motor through rawhide spur gears and motor pinion.

The spacing table is 3 ft. wide and long enough to accommodate a 30-ft. plate. The rollers upon which the spacing table operates are 12 in. in diameter. They



Holes 1½ In. in Diameter Are Simultaneously Punched Through Opposite Edges of a 1½-In. Steel Plate

As will be noticed from the exterior view, the plant is surrounded by a high woven wire fence, and as an additional protection against trespassers a number of strands of barb wire are placed at the top.

Opens Washington Office

The Jones & Laughlin Steel Co., Pittsburgh, has opened a district sales office on the fourth floor of the Woodward Building, Washington, D. C., in charge of H. F. Holloway, who is district sales manager of the New York office of the company, and he will also hold the same title in the new Washington office. Mr. Holloway will be assisted by Ralph T. Rowles, who was formerly connected with the Philadelphia office, and covered the Washington, D. C., field. Mr. Rowles will now have his headquarters in the Washington office.

The Banner Machine Co., Columbiana, Ohio, will not move its plant to East Palestine, Ohio, as it had planned, but will remain in Columbiana, and is now making some large extensions, for which some new equipment will be needed. This includes the building of a machine shop, 90 x 105 ft., with the addition of a power plant, also a new foundry, 90 x 75 ft. and a new office building. Foundations for these buildings are in and bricklaying will start at once. A cupola which had been shipped to East Palestine for a proposed new foundry there was returned to Columbiana, and will be installed in a new foundry at that place. The Banner Machine Co. manufactures rubber molds, cores, and dies of all kinds, special rubber machinery, general machinery repair work, and special machinery.

are 3 in. wide and are flat on one side of the table and V-shaped on the other.

More Motor Truck Contracts Placed

In addition to the \$23,000,000 worth of motor trucks recently ordered for the War Department, orders have been placed for 5750 vehicles at an aggregate cost of \$21,000,000, making about \$44,000,000 worth of Army motor trucks now under contract. The quartermaster's depot in Chicago has also been advised to buy 192 light trucks of large chassis and Babcock delivery bodies for the Army cantonments, 12 to be issued to each place, the cost being \$750 each.

The Packard Motor Car Co., Detroit, received a contract for 3000 trucks of 3-tons capacity, of which 1200 will cost \$3,197.39 each, and 1800 will cost \$3,836.87 each. The Locomobile Co. of America, Bridgeport, Conn., received a contract for 1250 trucks at \$4,071.38 each and the Pierce-Arrow Motor Car Co., Buffalo, 1500 trucks at \$3,500 each, all of 1½ tons capacity.

The Bethlehem Steel Corporation has put into operation six of the 12 tin plate mills at Sparrows Point, Md., which are being constructed at a cost said to approximate \$2,000,000. The works are operated wholly by electricity. J. M. Jones, manager of the plant, was for years vice-president and general manager of the Massillon Rolling Mill Co., Massillon, Ohio.

The British Board of Trade advises all British exporters, shipping to neutral European countries, of the desirability of concluding all contracts on a f.o.b. instead of a c.i.f. basis.

Government Control of Coal and Coke

A Broad Commandeering Provision to Become a Law This Week—Price Fixing and Complete Regulation of Fuel

WASHINGTON, Aug. 7.—Although the conference committee in charge of the Lever food control bill has eliminated from its provisions iron and steel, copper, lead and other metals, yet in the draft of the bill as finally agreed to it has incorporated an important category of articles of much interest to iron and steel producers. The conference agreement has been reached after prolonged discussion and it is expected that the measure will receive the President's signature during the present week.

The provision of the bill authorizing the President, through such agency as he may select, to control the distribution of products subject to the act enumerates "foods, feeds, fuel, including fuel oil and natural gas, and fertilizer and fertilizer ingredients, tools, utensils, implements, machinery and equipment required for the actual production of foods, feeds and fuel." These articles are classified in the bill as "necessaries" and it is to "assure an adequate supply and equitable distribution thereof" that the law is to be placed on the statute books.

President May Control All Fuel

The practical effect of the measure, therefore, will be to place under the supervision of the officer designated by the President to execute the provisions of the law all coal, coke, fuel oil and natural gas, machinery employed for the mining of coal, the drilling of oil wells, the manufacture of flour and all other food products, and all tools, utensils, implements, etc., used in these numerous lines of industry. While the language employed in this section is vague, it certainly does not lack comprehensiveness and as the President or the agent appointed by him will be the sole judge of the scope of the law it is evident that ordinary rules of statutory construction are not to be relied upon. The President is specifically authorized "to make such regulations and to issue such orders as are essential effectively to carry out the provisions of this act" and no appeals will lie from either regulations or orders.

A series of criminal offenses is created by section 4 of the bill as agreed to, this provision amounting in effect to the suspension of the Sherman act and other antitrust statutes with respect to the articles coming within the purview of the proposed law. These offenses include hoarding or monopolizing any of the articles mentioned, the making of "any unjust or unreasonable rate of charge in handling or dealing in" any of the "necessaries" mentioned, or conspiring, combining, agreeing or arranging to limit the facilities for transporting, manufacturing, or dealing in any of them, or the exacting of excessive prices therefor. Any person who violates any of these provisions is liable to a fine of \$10,000 or imprisonment not exceeding two years or both.

Licenses May Be Required

Whenever in the judgment of the President it shall become necessary, he is authorized to license the importation, manufacture, storage, mining or distribution of any of the articles under supervision and thereafter it is made unlawful for any person without such license to produce, store or distribute any of the articles referred to. The President is authorized to prescribe regulations for the issuance of licenses and requirements for systems of accounts and auditing of accounts to be kept by licensees and the entry and inspection by duly authorized agents of the places of business of licensees.

One of the most comprehensive features of the bill as agreed to provides that whenever the President shall find it is necessary to secure an adequate supply of any of the commodities mentioned for the support of the

Army or the maintenance of the Navy "or for any other public use connected with the common defense" he is authorized to requisition and take over for use or operation by the Government any factory, oil-pipe line, mine, or other plant and to operate the same. The compensation for such commandeering is to be determined by the President and in the event that the sum offered is not satisfactory the owner of the commandeered facilities will be entitled to receive 75 per cent of the amount determined by the President and may sue the Government for the remainder in the United States Court of Claims.

Federal Trade Commission the Medium

Contrary to the general impression, this extraordinary measure is not limited in respect to price fixing to food products. Section 24 provides specifically that the President, whenever in his judgment it is necessary for the efficient prosecution of the war, "may fix the price of coal and coke, wherever and whenever sold, either by producer or dealer, to establish rules for the regulation of and to regulate the method of production, sale, shipment, distribution, apportionment, or storage thereof among dealers and consumers, domestic or foreign; said authority and power may be exercised by him in each case through the agency of the Federal Trade Commission, during the war or for such part of said time as in his judgment may be necessary." No commandeering statute heretofore considered is broader in scope than this provision which authorizes the President whenever any "producer or dealer fails or neglects to conform to such prices or regulations, or to conduct his business efficiently under the regulations and control of the President as aforesaid, or conducts it in a manner prejudicial to the public interest" to requisition and take over the "plant, business, and all appurtenances thereof belonging to such producer or dealer as a going concern, and to operate or cause the same to be operated in such manner and through such agency as he may direct during the period of the war or for such part of said time as in his judgment may be necessary."

Cost of Coal and Coke Left in Doubt

While the President is thus authorized to fix the price of coal and coke, both for the Government and for private consumers, the bill goes further and provides that if the prices so fixed are not satisfactory to the producers or dealers payment may be made to the extent of 75 per cent of the prices fixed by the Government and the producers or dealers may sue in the Court of Claims for any amount claimed to be due in the same manner as is provided for the owners of plants taken over by the President's order. Obviously this provision introduces a complication, for even should the President fix the price of coal and coke by public announcement no consumer supplied under this arrangement will be able to figure accurately the price he may ultimately be obliged to pay should the producer or dealer be dissatisfied with that fixed by the President.

An alternative provision is included in the bill to the effect that if the President shall be of the opinion that he can better provide for the common defense and the efficient prosecution of the war, "then he is hereby authorized and empowered to require any and all producers of coal and coke, either in any special area or in any special coal fields or in the entire United States, to sell their products only to the United States through an agency to be designated by the President, such agency to regulate the resale of such coal and coke and the prices thereof and to establish rules for the regulation of and to regulate the methods of production, ship-

ment, distribution, apportionment, or storage thereof among dealers and consumers, domestic or foreign, and to make payment of the purchase price thereof to the producers thereof or to the person or persons legally entitled to said payment."

Cost Plus "Fair and Just Profit"

A feature of this important measure which bears upon the broad question of the factors which are to be taken into account in the fixing of prices by the Government is a provision stipulating the method by which the Federal Trade Commission shall fix the prices to be paid for coal and coke. These prices, it is provided, "shall be based upon a fair and just profit over and above the cost of production, including proper maintenance and depletion charges." As this is a mining proposition Congress has not thought it necessary to provide that the price shall include a profit that will take care of extension which, presumably, will be taken into account by the Federal Trade Commission in the fixing of prices for the output of manufacturing concerns.

It would be idle to speculate on the conditions under which the Government may take over the product of the coal mines or the coke ovens. The significant fact is that the Lever bill furnishes all the necessary authority to enable the President to commandeer mines, ovens and output. It may fairly be assumed that with the Lever bill on the statute books the Government will be able in most cases to negotiate satisfactory terms for both official and private supplies without resorting to the expedient of commandeering.

W. L. C.

British Trade Union Rules After the War

The interim report on joint standing industrial councils, made by the British Reconstruction Committee's sub-committee on relations between employers and employed was issued recently. The report recommends that the Government should propose without delay to the various associations of employers and employed the formation of joint standing industrial councils in the several industries where they do not already exist, composed of representatives of employers and employed, regard being paid to the various sections of the industry and the various classes of labor engaged. As to the guarantees for the restoration of trade union rules and customs, the report says that while this does not mean that all the lessons learned during the war should be ignored, it does mean that the definite co-operation and acquiescence of both employers and employed must be a condition of any setting aside of these guarantees or undertakings. The report suggests that the following proposals should be laid before the national industrial councils:

First, district councils representing trade unions and employers' associations to be created or developed out of the existing machinery; second, works committees representing management and workers to be instituted in particular plants to act in close co-operation with the district and national machinery.

The report suggests a number of questions to be dealt with, including technical training, industrial research, legislation affecting the special industry, security of earning and unemployment and conditions of employment.

The Old Dominion Iron & Nail Works Co., whose business was founded in 1836, discontinued the manufacture of cut nails some years ago, and having recently embarked in the manufacture of steel by the electric process, found it desirable to change the title of the company to the Old Dominion Iron & Steel Corporation, and this was done on July 12. Under the new title the company will continue to devote its attention to the manufacture of puddled iron bars, electric steel bars and horse and mule shoes.

From 40 to 60 tons of tungsten ore, containing from 60 to 72 per cent of WO₃, is mined each month in the Siamese Malay States, according to a local mining engineer of the Bangkok district.

To Build Composite Ships Near Mobile

The contract of the Kelly-Atkinson Construction Co., Chicago, with the United States Emergency Fleet Corporation for 18 cargo-carrying steamers covers delivery of complete ships, including propelling machinery, deck and cabin equipment, etc. They are to be composite or so-called McClelland ships with all-steel frames and wood plating. Each ship will require 800 tons of steel and 400,000 board ft. of timber. More regular structural shapes will be used than is usual in ship construction. The ships are to be 286 ft. long, 46 ft. beam and 24 ft. draft.

The company has purchased 16 acres on the Mobile River, Mobile, Ala., known as the Hieronymous tract, and will have a deep channel in fresh water free of ship worms or barnacles. Work has been started on the yard, which will contain six berths 52 by 535 ft. The plant will employ from 1000 to 1200 men. Officers of the company follow: W. L. Kelly, president; M. R. Fife, secretary and treasurer; Frank McLaughlin, chief engineer. Mr. McLaughlin was formerly contracting manager of the Federal Bridge & Structural Co., Waukesha, Wis.

New Proving Ground in Illinois

WASHINGTON, Aug. 7.—The War Department to-day issued orders for the clearing of 12,500 acres of land near Savannah, Ill., for use as a proving ground for large guns manufactured at Government arsenals. The work of preparing the ground and the construction of the necessary buildings will proceed under the direction of Col. George W. Burr, commandant of the Rock Island Arsenal, and it is understood that the testing field will be ready for the actual proof of large field pieces by Sept. 1.

The Ordnance Bureau announces that practically all the guns manufactured for the Army will be tested at the Savannah plant. Those manufactured at the Watervliet Arsenal will be sent to Rock Island, where carriages and caissons are manufactured and will be taken thence overland to the testing ground.

Ordnance Company Organized

CLEVELAND, Aug. 8.—(By Wire).—The Inland Ordnance Co. has been incorporated with \$500,000 capital by interests identified with the McMyler Interstate Co. here and will manufacture medium sized ordnance in a portion of the McMyler plant at Bedford, Ohio, taken over for the purpose. The officers are: President, Frank H. Ginn; vice-presidents, R. W. Kaltenbach and Justin Griess; treasurer, H. H. Hammond, and secretary, W. Lovell.

The company has placed an order with the Carnegie Steel Co. for 6000 tons of nickel steel for forgings for 3 and 4-in. guns awarded it by Federal Government. It also has inquired for 4000 to 6000 tons of shapes for further extension of the McMyler plant, which it plans to have ready for occupancy in 60 days.

The Lau Iron Works, Youngstown, Ohio, with an authorized capital of \$350,000, \$100,000 preferred and \$250,000 common, has been incorporated by A. W. Lau, E. E. Swartswelter, John R. Rowland, John T. Harrington and H. E. Grosshans. The new company will take over the business which heretofore had been conducted under the same name with A. W. Lau as proprietor. The corporation was formed to bring new capital and provide for extension. Of the authorized capital none of the preferred will be issued at this time, and only about half of the common. A 4½-acre plant site in the Brier Hill district was acquired some time ago at a cost of \$16,000. The company will fabricate structural and decorative iron and steel.

The Standard Tin Plate Co., Canonsburg, Pa., has advanced labor not affected by the Amalgamated Association scale, about 12½ per cent, now paying common labor 31c. per hour for 10 hours a day. The company also recently signed the Amalgamated Association scale for tin mills for the first time in some years.

ESTABLISHED 1855

THE IRON AGE

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The Draft in Munitions Centers

There is general approval of the thoroughness and care with which the draft is being put into effect. Employers are seeing, however, with increasing clearness that the population estimates on which the draft quotas have been made up throw a most inequitable burden on the centers of production of war supplies.

Two factors have brought about this injustice—the presence of a large floating population of men of the draft age and the very high percentage of aliens in both the permanent and temporary populations. Bridgeport, Conn., is an example. Its actual population probably does not much exceed 185,000; its population estimate furnished by the Census Bureau for draft purposes is 278,000, based upon a registration of over 26,000. A majority of the registrants are aliens. The minority citizen element is composed largely of young men in training to be the skilled machinists, tool and gage makers, forgers and brass workers, from whom must be drawn the directing forces of production in the coming years, perhaps in a single year if war necessities demand the continued rapid expansion of Bridgeport's industries such as has marked the past two years.

While it is true that the provision for exemption of industrial workers opens a way to hold many valuable men in industry, employers are none too eager to appear before the Federal district exemption boards and ask for the retention of large groups of employees. They appreciate that under Bridgeport's conditions the wholesale exemption of factory workers on top of the heavy exemption of aliens and those with dependents will impose the entire burden of military conscription upon a comparatively small class of clerical, mercantile and public service employees and the younger men of the professions. As the names of those asking exemption are to be published, an employer requesting any considerable number of exemptions may find himself subject to much deserved or undeserved criticism. It would help matters if the full extent of the Government's future demands on industry were known; without this knowledge and with-

out experience to dictate the relative value of many of his employees in military or industrial activity, the way of the manufacturer is beset with thorns.

The Connecticut Council of Defense has sent to Provost Marshal General Crowder an urgent plea for a change in the rule of apportionment, as applied to Connecticut, before the next levy and that some credit be given then for the excessive quota of the State in the first levy. The council's analysis of the situation will apply with nearly equal force in other States. It points out the obvious injustice of inflated population figures, stating that of the total registration of 159,890, 34,276 are men with dependents and 58,000 are friendly or neutral aliens. These 58,000 aliens, it is claimed, are almost wholly unmarried laborers who represent themselves alone but, in the population figures employed for draft purposes, furnish the basis for an increment of 500,000 in population. The council believes that the exemption of such aliens will act as a bar to further naturalization, as they will be desirous of maintaining their present status so long as it enables them to earn the high wages of the war period and avoid military obligations.

The deduction is drawn from a State census made this year of all males over 15 years of age that with all classes of exemptions less than 50 per cent of the Connecticut registration of 159,890 will be actually liable for military service. The council claims that the quota demanded is fully 4000 in excess of a fair allotment and that the census estimate of 1,719,623 population for the State is at least 400,000, or 30 per cent, greater than the actual population. Under the operation of the draft system, the presence of the great factories which are expected to furnish more than 50 per cent of the nation's supply of arms and munitions augments the number of registrants but decreases the available supply of men for military service. The council contends that the so-called estimates of population have caused a violation both in spirit and letter of the apportionment section (section 4) of the law creating the new army.

One effect of the draft and the previous enlistment of workers in industrial centers has been the temporary raising of the maximum age limit or the

abrogation of age limits as previously imposed by employment departments. An employer in Worcester recently advertised for a group of machinists, 60 years of age or older. His company was not wholly influenced by the need of more machinists; it had reached the conclusion that in highly skilled work experience is more valuable than mere activity. It has demonstrated to its own satisfaction that the older men can maintain both production and quality, are more settled and stable in their habits and are little influenced by labor agitators or other disturbing elements of industry. Other manufacturers, including Government arsenals, have opened the doors to their pensioners and have had a prompt response from those still capable of manual labor. Women workers have gradually invaded many departments of industry and their capacity has opened the eyes of many an employer, so much so that their future place in the factories seems assured. From the ranks of older men and deft and sturdy women will come much of the labor to replace drafted workmen.

Commandeering Machinery for War

Government direction of industry, which is all but authorized in coal mining and distribution, is making a start in machinery and machine tools, where something akin to federal supervision is now in effect. One of the largest machine-tool companies, operating several plants, is placing practically all of its output as the Government directs, and this policy is likely to extend to other plants as the Government necessities become more urgent.

A severe tax has been placed on many machine-tool plants by the Government war program. With calls from munition works, airplane factories and shipyards, in addition to the normal demand from a diversity of industries, the builders of metal working machinery have gradually been obliged to cancel or postpone delivery of many orders for private consumers not engaged on Government work and turn their output over to concerns which the Washington authorities have designated as entitled to prior consideration.

Fortunately for the country, many companies which have been engaged in making munitions for the Allies have their plants well equipped and their recent needs have been confined chiefly to a comparatively few machines to replace those which had become worn out or defective. New munitions plants have been or are being equipped, and the rapidity with which machine tools have been furnished to them is highly creditable.

The problem of the new shipyards is much more formidable and it seems quite unlikely that many of the projected yards can be completely equipped before the opening of the new year even if work is started very promptly. The delays in getting the shipbuilding program under way have led some machine-tool concerns to accept attractive offers for equipment from other sources, particularly for export. However, as such contracts contain a protection clause there will be no hardship to the sellers if the Government decides later to take over the machines for war work.

The good progress the country is making in providing the main implements of war—munitions,

airplanes and ships—has been largely possible through the loyal co-operation of the machinery and metal working tool manufacturers. The latter, in fact, in some instances, have kept ahead of the Government, and some impatience has cropped out because delays at Washington have foiled well laid plans for speeding up plant to meet emergencies.

Excess Profits Taxes on Steel

In reporting earnings for the second quarter of the year the United States Steel Corporation deducted an allowance for the prospective excess profits tax, while in the statement for the first quarter such allowance could not be made. The allowance has since been made as a deduction from the half year's surplus. Making the statement in similar form for the two quarters, the profits without allowance for the tax were \$113,121,018 in the first quarter and \$144,498,076 in the second quarter. With allowance for the tax the remaining earnings were \$79,256,018 for the first quarter and \$90,579,204 for the second quarter.

The reported earnings for June were \$31,284,562 and the estimated excess profits tax for the month would be about \$18,700,000, making approximately \$50,000,000 for the total profits in the month. The shipments were about 1,250,000 gross tons, so that the total profits were about \$40 per ton, and the amount set aside for excess profits tax was about \$15 per gross ton.

In 1916 the production of finished rolled steel in the United States was 30,500,000 gross tons, and an output of say 31,500,000 tons may perhaps be expected for this year. At \$15 per ton the revenue from the steel industry alone, using the Steel Corporation's experience as a rough basis for comparison, would be about \$465,000,000, quite a tidy sum for the Government to collect from an industry which is expected to aid it in the furnishing of materials as well as in the paying of taxes. It is to be observed, too, that the prices realized upon the Steel Corporation's shipments in June were much lower than the prices quoted as the market during the past few months, the orders having been taken largely before the beginning of this year.

Labor Leaders Stop a Strike

Recent strikes by labor unions to force recognition when war necessity compelled plant operation have been little less than treasonable. And now the switchmen's strike in Chicago has come and gone. It lasted but two days and did little harm, but it would have had the gravest consequences had it taken the course prescribed for it by the head of the Brotherhood of Railway Trainmen. Not only would lives have been menaced by a shortage of ice and other necessities, but military supplies awaiting shipment to Atlantic coast ports would have been seriously delayed.

Credit for the termination of the strike belongs to the brotherhoods embracing the locomotive engineers, firemen and conductors. At the same time their action did not proceed from unalloyed patriotism or a sense of what was ethically demanded; rather, they foresaw, in the event of the continuance of the strike, the possibility that Con-

gress might enact a law for compulsory arbitration of strikes—one of the last things organized labor wants to see. Moreover, they were not slow to see that no such strike can win a particle of public sympathy at this time. There was also the fact that the strike was not unanimous, as the members of the Switchmen's Union of North America, a powerful organization, did not leave their work on the 19 roads affected. The leaders of this union declared that one purpose of the strike was to eliminate it from the field, and the fact that the Brotherhood of Railway Trainmen sought preferential treatment for its members in the employment of new switchmen gave color to this contention. The point was lost. It was virtually a demand for the closed shop. Other matters at issue, including the question of meal hours, appointment of yardmasters and the employment of new men, are to be settled by a joint board of the railroad managers and labor leaders.

Whatever motives were uppermost in causing the three brotherhoods to force an end of the strike, they did well. This is no time for such demands. Railroad workers least of all want the military control of transportation for which the Chicago strike was plainly headed.

Japan's Ship Plate Orders

Steel plate shipments to Japan have been an outstanding feature of our phenomenal war exports. Quick to perceive the profit to be made out of merchant vessels in the face of a wholesale destruction of shipping, the Japanese have been concentrating every energy on shipbuilding. No matter what the cost, they have seen that a good return on the investment was certain; that the earning power of a steel vessel for several years after the war would far more than compensate for its present high cost. Paying as high as 11c. and 12c. per pound for American plates delivered in Japan, their absorption of this material has been the outstanding feature of the plate market.

An analysis of our steel plate exports reveals the extent of this striking movement toward Japan. By leaps and bounds the outgo to that country has increased from only 7250 gross tons in 1913 and 3275 tons in 1914 to 89,458 tons in 1916. For the ten months ended April 30, 1917, Japan's share of plate exports was 138,565 tons, or nearly 50 per cent of the total. The movement is a striking example of Japanese business acumen.

It is too early to measure the effect of the steel embargo, but it is hardly to be supposed that Japan will bring her shipbuilding program to a standstill by failing to make a reasonable contribution of vessel tonnage to the urgent needs of the Allies in Atlantic transport.

The Nagle Steel Co., Pottstown, Pa., has acquired property consisting of about 170 acres in the Brooke district, near Pottstown. It is said that the company is planning for the erection of a new steel works to include open-hearth furnaces and plate and slabbing mills.

The Johnson & Barry Steel Co., Birmingham, Ala., which was recently incorporated, is doing a structural steel and steel jobbing business and is a fabricator of plate and structural work.

FRANCE'S AID IN AVIATION

To Keep 5000 Planes in Service Means Building 18,000 in Nine Months

WASHINGTON, Aug. 7.—The passage last week of the aviation bill appropriating \$640,000,000 for aeroplanes, engines, and all the necessary equipment for the organization of a huge corps of fliers has been followed by the rapid development of the War Department's plans to execute the law. In this work the department is receiving the co-operation of the French aviation corps which has detailed Captain de la Grange to act as technical advisor. In a statement given out by this expert through the Committee on Public Information some of the manufacturing problems to be encountered are pointed out and the steps taken to meet them are described.

2000 Planes and 4000 Motors Per Month

"If the Government wishes to, before April 1, 1918, it can have a tremendous aero fleet," says Captain de la Grange. "Suppose it decided to have only 5000 planes and 10,000 motors. In order to keep that number of aeroplanes always at the front, it will be necessary to build 2000 planes and 4000 motors per month, viz., 18,000 planes and 36,000 motors during the next nine months. This means a great effort on the part of the American factories. They can make this effort, as they have already the buildings, the workmen and part of the machinery needed. They have also a large number of the best scientists and technicians. The size of the orders given them will insure obtaining the money necessary to organize the plants for their construction.

"Two difficulties will be met at once; the first, that of skilled labor. The American industry, as far as possible, has replaced manual labor by machines. The following motto is written in one of the American factories: 'Manual labor must be abolished whenever a machine can take its place.' In constructing airplanes machines are not sufficient; very good fitters are needed, and a great number of them also; they must be taught the methods used in French and English factories.

"The necessary steps should be taken to recruit these men as soon as possible, and in view of this the board of production is sending a commission composed of skilled workmen to France so that they may study the methods used in the factories there. When finished, they will return to the United States, they will supply all they have learned and will be able to train the workmen as well.

"The second difficulty is that of manufacturing quickly enough machines and tools necessary for building such a large supply of planes and motors. Although the best American engineers are giving all their attention to this, it will be impossible, I am afraid, to build these machines fast enough so that at Jan. 1, 1918, each factory will be able to produce, not 10 motors per month but 20 and 30.

Work Must Go On Night and Day

"In my opinion, there is only one way in which this difficulty can be surmounted. It is to realize that the work must go on night and day, and to organize night shifts so that the machines will never be idle. The French workmen, when they understood how important it was to turn out for the front planes and motors in great numbers and as rapidly as possible, did not hesitate to adopt night work, because they knew that their work at the factories would save the lives of their comrades who during this time were fighting in the trenches."

In the opinion of this expert it will not be practicable to transport to France the bodies of the flying machines because of their great bulk which would necessitate a large amount of cargo space. He therefore suggests that the motors be manufactured in this country and shipped abroad at the rate of approximately 4000 per month, and that factories be established in France to build the bodies. In this way a large corps of American aviators fully equipped with airplanes would be ready

next spring. The Allies acquired and still control the supremacy of the air, but they cannot develop their aviation to any further point. The American contingent would make it possible to overwhelm the foe, to hasten the final victory and to save thousands of lives.

GISHOLT CO. TO MAKE GUNS

Madison, Wis., Machine-Tool Concern Organizes New Company at Request of Government

The Northwestern Ordnance Co., Madison, Wis., has been incorporated with a capital stock of \$100,000 by representatives of several large metal-working interests at Madison, at the request of the Government, for the specific purpose of manufacturing field pieces of the 4.7-in. type for the United States Army. The organization is similar to the Wisconsin Gun Co., organized recently at Milwaukee, as previously noted, by representatives of five large metal-working corporations, to build 3-in. field pieces of the 1916 model.

The new Madison company is largely financed by C. A. Johnson, president, and H. S. Johnson, vice-president of the Gisholt Machine Co. It will undertake immediately the erection of a machine-shop on land leased from the Gisholt company. The general contract for the work has been awarded to the Worden-Allen Co., Milwaukee, which also is building the new shop of the Wisconsin Gun Co. at Milwaukee. The two shops will be similar in size and construction, being about 130 x 300 ft., of steel and brick, with concrete foundations and floors, affording about 40,000 sq. ft. of floor space.

As in the case of the Milwaukee company, the Northwestern company will do only the machine-work and assembling of the ordnance, the rough forgings being furnished by the Government. The two plants will each employ about 400 highly skilled machinists. The projects are financed by Madison, Wis., capital without the hope of fee or reward or profit, the Government having informally stated that as soon as practicable it will take over the works and reimburse the financiers.

As mentioned in THE IRON AGE of Aug. 2, the Bullard Machine Tool Co., Bridgeport, Conn., is considering the request of the Government to build a plant similar to that which will be conducted by the Gisholt Machine Co. interests. THE IRON AGE also learns that the Otis Elevator Co. and the Niles-Bement-Pond Co. have also been asked by the War Department to build or equip gun-making plants of the same type.

Expansion of the Stavanger Electro-Steel Works

A new rolling mill will be added to the plant of the Stavanger Electro-Steel Works, Stavanger, Norway, and an American expert has been employed to design it. Since Jan. 1, 1917, the company, established in 1913, has increased its capital from \$300,000 to over \$1,000,000. Most of the product sold so far has been raw steel. The plan is to double the output by installing electricity and to turn out a finished rolling mill product.

The American expert has advised that work be pushed on the project as soon as possible in spite of the increased cost of materials and wages. It is thought that countries previously supplying the world with much of its steel will, after the war, be first employed in replacing and renewing their own supply. This should give the Norwegian plant a chance.

That the company may be quite independent of imported fuel, it has taken over a power company located near it, whose plant when fully developed can deliver 12,000 to 14,000 hp. Of this, 1600 hp. is already in use and 5600 hp. is under completion for the steel works.

The Berwick plant of the American Car & Foundry Co. has received an order for 42,000 galvanized smokestacks for the Government cantonment camps; 6000 iron collars will also be made. The company plans to ship four carloads daily of finished product.

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PIG-IRON OUTPUT FALLS

Coke Still the Limiting Factor

Production of 3,342,438 Tons, or 107,820 Tons per Day, in July

The rate of pig-iron production fell off further in July, the output for the month being 3,342,438 tons, or 107,820 tons per day, as against 3,270,055 tons in the 30 days of June or 109,002 tons per day. Coke scarcity caused bankings of furnaces in various districts and output was cut down further by heat and humidity. Various furnaces were blown in in July and others went out, leaving the number of active furnaces on Aug. 1 at 351, or the same as on July 1. The active capacity Aug. 1 is estimated at 109,248 tons per day against 111,755 tons per day on July 1.

Daily Rate of Production

The daily rate of production of coke and anthracite pig iron by months, from July, 1916, is as follows:

Daily Rate of Pig-Iron Production by Months—Gross Tons			
	Steel Works	Merchant	Total
July, 1916	74,397	29,620	104,017
August	74,617	28,729	103,346
September	76,990	29,755	106,745
October	81,639	31,550	113,189
November	80,141	30,253	110,394
December	74,264	28,273	102,537
January, 1917	72,394	29,249	101,643
February	65,280	29,193	94,473
March	73,731	31,132	104,863
April	79,031	32,134	111,165
May	77,561	32,677	110,238
June	76,805	32,197	109,002
July	76,440	31,389	107,820

Capacity in Blast Aug. 1 and July 1

The following table shows the daily capacity in gross tons of furnaces in blast Aug. 1 and July 1 by districts:

Coke and Anthracite Furnaces in Blast					
Location of furnaces	Total number of stacks	Aug. 1 Number in blast	Aug. 1 Capacity per day	July 1 Number in blast	July 1 Capacity per day
New York:					
Buffalo	18	17	5,705	18	5,985
Ferro	1	1	50	1	60
Other New York	5	3	665	2	475
New Jersey	4	3	605	3	640
Ferro	1	0	0	1	50
Pennsylvania:					
Lehigh Valley	21	14	3,542	14	3,695
Spiegel	2	2	214	2	220
Schuylkill Val.	12	10	2,960	11	3,175
Spiegel	1	1	95	0	0
Lower Susquehanna	7	6	1,577	6	1,610
Lebanon Valley	8	8	1,055	8	1,060
Ferro and Spiegel	3	2	105	1	45
Pittsburgh Dist.	53	48	22,020	47	22,150
Ferro and Spiegel	4	4	555	4	450
Shenango Val.	19	18	5,645	19	6,105
Western Pennsylvania	25	23	6,885	22	6,954
Ferro and Spiegel	3	1	84	2	210
Maryland	3	3	952	3	1,355
Ferro	1	1	95	1	100
Wheeling District	14	12	4,183	12	4,147
Ohio:					
Mahoning Val.	25	25	10,392	25	10,450
Central and Northern	26	25	9,661	25	9,355
Hocking Val. and Hang. Rk.	15	15	1,858	14	2,042
S. W. Ohio	37	33	16,145	33	16,304
Illinois and Ind.	2	1	66	1	72
Ferro	2	1	66	1	72
Michigan, Wis. & Minn.	12	10	2,472	11	2,748
Colorado & Missouri	5	4	1,084	4	1,110
Ferro	2	1	86	1	50
The South:					
Virginia	18	12	1,376	12	1,515
Kentucky	5	4	558	4	610
Alabama	37	31	7,410	31	7,648
Ferro	1	1	68	1	75
Tenn. and Ga.	16	12	1,080	12	1,290
Total	406	351	109,248	351	111,755

Among furnaces blown in in July were Northern in eastern New York, one Steelton in the Susquehanna Valley, Lebanon Valley and one Bird Coleman in the Lebanon Valley, one Edgar Thomson, one Isabella and Neville Island in the Pittsburgh district, one Cambria

in western Pennsylvania, Star in Hanging Rock district, and one Gary in the Chicago district.

The list of furnaces blown out last month includes one Susquehanna in the Buffalo district, one Wharton in New Jersey, one Steelton in the Susquehanna Valley, one Eliza and one Monongahela in the Pittsburgh district, Atlantic in the Shenango Valley, one South Chicago in the Chicago district and one Bay View in Wisconsin.

Production of Steel Companies

Returns from all furnaces of the United States Steel Corporation and the various independent steel companies show the following totals of steel-making iron month by month, together with ferromanganese and spiegeleisen. These last, while stated separately, are also included in the columns of "total production."

Production of Steel Companies—Gross Tons					
	—Pig, total production—			Spiegeleisen and ferromanganese	
	1915	1916	1917	1915	1916
Jan.	1,115,944	2,251,035	2,244,203	18,041	24,866
Feb.	1,237,380	2,183,845	1,829,846	13,319	23,877
Mar.	1,551,082	2,365,116	2,285,430	12,274	29,388
Apr.	1,584,111	2,316,768	2,370,937	12,337	31,862
May	1,694,290	2,408,890	2,404,380	13,440	35,844
June	1,770,657	2,295,784	2,304,155	19,200	38,597
July	1,949,750	2,306,303	2,369,630	17,854	31,353
Aug.	2,101,818	2,313,122	.....	27,463	33,338
Sept.	2,129,322	2,309,710	.....	23,159	29,451
Oct.	2,281,456	2,530,806	.....	23,992	34,566
Nov.	2,198,459	2,404,210	.....	28,741	44,975
Dec.	2,283,047	2,294,620	.....	25,004	43,470

Output by Districts

The accompanying table gives the production of all coke and anthracite furnaces in July and the three months preceding:

Monthly Pig-Iron Production—Gross Tons				
	Apr. (30 days)	May (31 days)	June (30 days)	July (31 days)
New York	188,547	198,111	193,198	194,255
New Jersey	6,863	9,485	14,340	18,990
Lehigh Valley	119,962	117,584	114,465	116,432
Schuylkill Valley	86,416	100,531	94,097	94,578
Lower Susquehanna and Lebanon Valley	80,673	83,985	79,989	84,540
Pittsburgh district	705,992	690,919	651,768	664,456
Shenango Valley	183,288	176,200	171,074	174,614
Western Pennsylvania	202,733	211,621	202,145	215,192
Maryland, Virginia and Kentucky	94,754	106,768	99,238	89,603
Wheeling district	129,569	129,169	125,403	129,689
Mahoning Valley	323,683	335,797	307,829	322,165
Central and Northern Ohio	283,067	276,712	278,396	299,458
Hock. Val., Hang. Rk. & S. W. Ohio	56,556	55,544	60,866	55,186
Chicago district	470,338	506,297	489,780	503,946
Mich., Minn., Mo., Wis. and Col.	124,088	122,312	118,109	114,952
Alabama	246,164	260,969	234,259	231,738
Tennessee and Ga.	32,267	35,336	35,099	32,644
Total	3,334,960	3,417,340	3,270,055	3,342,438

The Record of Production

Production of Coke and Anthracite Pig Iron in the United States by Months Since Jan. 1, 1913—Gross Tons

	1913	1914	1915	1916	1917
Jan.	2,795,331	1,885,054	1,601,421	3,185,121	3,150,938
Feb.	2,586,337	1,888,670	1,674,771	3,087,212	2,645,247
Mar.	2,763,563	2,347,867	2,063,834	3,337,691	3,251,352
Apr.	2,752,761	2,269,655	2,116,494	3,227,768	3,334,960
May	2,822,217	2,092,686	2,263,470	3,361,073	3,417,340
June	2,628,565	1,917,783	2,380,827	3,211,588	3,270,055
July	2,560,646	1,957,645	2,563,420	3,224,513	3,342,438
7 mo.	18,909,420	14,359,360	14,664,237	22,634,966	22,412,330
Aug.	2,545,763	1,995,261	2,779,647	3,203,713	.....
Sept.	2,505,927	1,882,577	2,852,561	3,202,366	.....
Oct.	2,546,261	1,778,186	3,125,491	3,508,849	.....
Nov.	2,233,123	1,518,316	3,037,308	3,311,811	.....
Dec.	1,983,607	1,515,752	3,203,322	3,178,651	.....
Total, yr.	30,724,101	23,049,752	29,662,566	39,039,356	.....

The figures for daily average production, beginning January, 1910, are as follows:

Daily Average Production of Coke and Anthracite Pig Iron in the United States by Months Since Jan. 1, 1910

	1910	1911	1912	1913	1914	1915	1916	1917
Jan.	84,148	56,752	66,384	90,172	60,808	51,659	102,746	101,643
Feb.	85,616	64,090	72,442	92,369	67,453	59,813	106,456	94,473
Mar.	84,459	70,036	77,591	89,147	75,738	66,575	107,667	104,882
Apr.	82,792	68,836	79,181	91,759	75,665	70,550	107,592	111,165
May	77,102	61,079	81,051	91,039	67,506	73,015	108,422	110,238
June	75,516	59,585	81,358	87,619	63,916	79,361	107,053	109,002
July	69,305	57,841	77,738	82,601	63,150	82,691	104,017	107,820
Aug.	67,963	62,150	81,046	82,057	64,363	89,666	103,346	.....
Sept.	68,476	65,903	82,128	83,531	62,753	95,085	106,745	.....
Oct.	67,520	67,811	86,722	82,133	57,361	100,822	113,189	.....
Nov.	63,659	66,648	87,697	74,453	50,611	101,244	110,394	.....
Dec.	57,349	65,912	89,766	63,987	48,896	103,333	102,537	.....

Diagram of Pig-Iron Production and Prices

The fluctuations in pig-iron production from January, 1909, to the present time are shown in the accompanying chart. The figures represented by the heavy lines are those of daily average production by months of coke and anthracite iron. The two other curves on the chart represent monthly average prices of Southern No. 2 foundry pig iron at Cincinnati and of local No. 2 foundry iron at furnace at Chicago. They are based on the weekly market quotations of THE IRON AGE.

Blast Furnace Notes

Final payment was made last week by Harrison W. Matthews in the purchase from the receivers of the property of the Dayton Coal & Iron Co., Dayton, Tenn., reported several weeks ago. The cash payment amounted to \$50,000 and notes were given for \$450,000 to representatives of the holders of the furnace company's bonds. Preparations have been made for the early blowing in of the Dayton furnaces. Mr. Matthews is president of the Matthews Iron & Mining Co., now operating a blast furnace at Rome, Ga.

The Minnesota Steel Co., Duluth, Minn., will blow out one of its furnaces in August for relining.

The West End furnace at Roanoke, Va., operated by the Old Dominion Pig Iron Corporation, is now known as the Old Dominion furnace.

The Juniata Furnace & Foundry Company, New-

port, Pa., expects to blow in its Marshall furnace on ferromanganese early in August.

Scarcity of material and labor has delayed the blowing in of Lochiel furnace at Harrisburg, Pa., scheduled for Aug. 1. It will probably start within the coming week.

The furnace of the Oriskany Ore & Iron Corporation, Lynchburg, Va., was blown out Aug. 2 for relining.

Neville Island furnace of the Carnegie Steel Company, which has been idle for several years, was blown in July 16.

Iron Rolling Mill at Riverdale, Ill., Sold

E. B. Lanman, H. A. Lanman and C. O. Lanman of the E. B. Lanman Co., East Chicago, have purchased the Riverdale, Ill., rolling mill built in 1908 by the Riverdale Iron & Steel Co., which has been closed down since December, 1911, and which was purchased by Armour Steel Co. in 1914. The plant has a bar mill with a capacity of about 30 tons of bar iron per day. The new owners expect to install another furnace and will start the mill on bars, squares and flats and possibly special shapes. To handle the property the Riverdale Rolling Mill Co. has been formed. The new organization is separate from the E. B. Lanman Co., although interests are the same. Latter company makes bolts, nuts and washers.

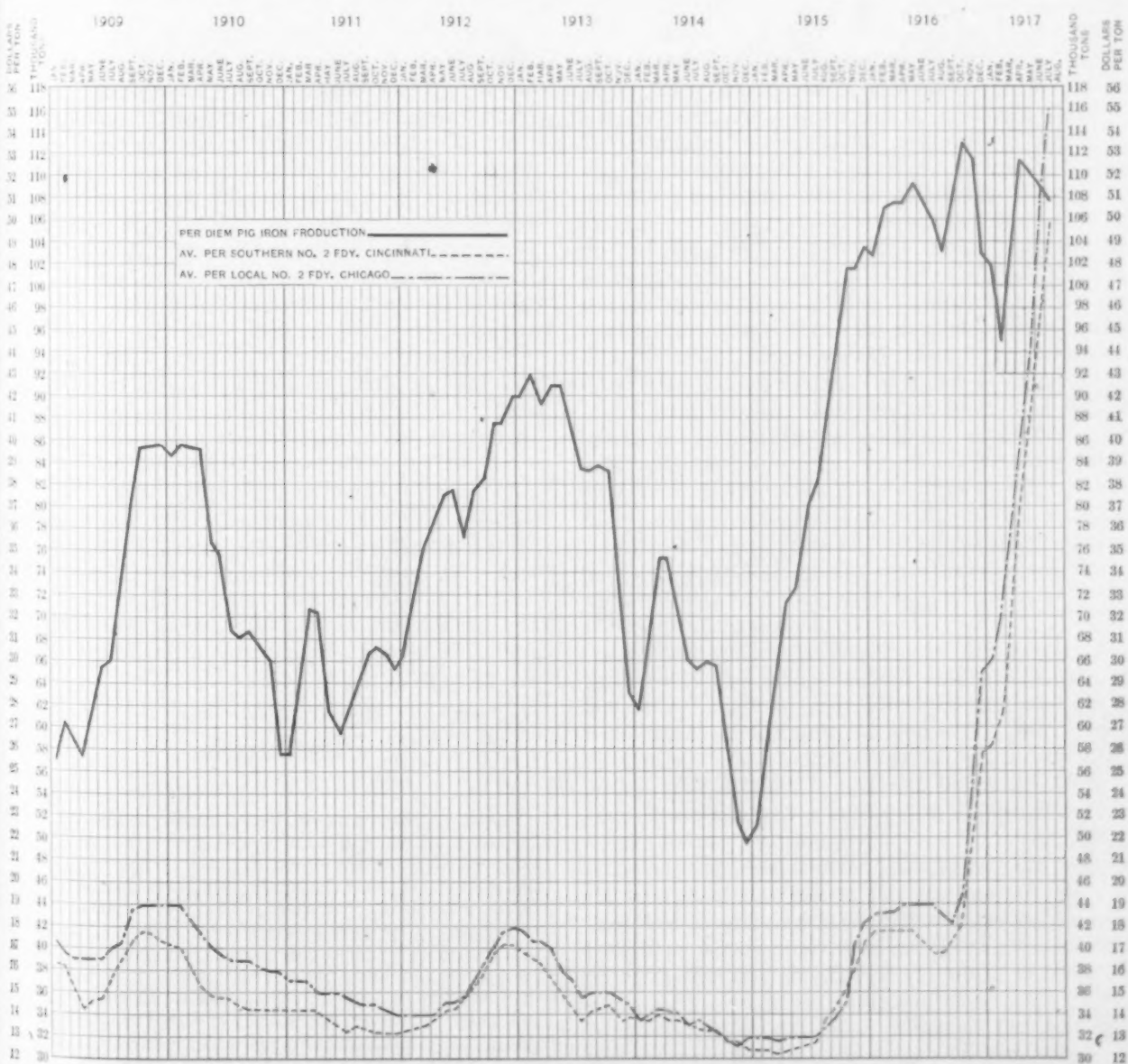


Diagram of Daily Average Production by Months of Coke and Anthracite Pig Iron in the United States from Jan. 1, 1908, to Aug. 1, 1917; Also of Monthly Average Prices of Southern No. 2 Foundry Iron at Cincinnati and Local No. 2 Foundry Iron at Chicago District Furnace

Iron and Steel Markets

DECLINE IN SHEET BARS

Freer Offerings of Semi-Finished Steel

Buying for the Allies Held Up—Some Resales of Export Material

Repeated outgivings from Washington of sweeping action intended in the Government's dealings with steel makers and the reiteration of the President's call for "one price for all" have only added to the uncertainty that is holding back all iron and steel markets. Price changes have been narrow, apart from semi-finished steel, in which offerings have been made at \$10 to \$15 a ton below the recent high level of \$100 for billets and \$105 for sheet bars.

It is known that buying for the Allies is held up by the steel cost inquiry and that more time will be necessary for the latter than was counted on. Meanwhile official statements of steps that will be taken in the handling of steel prices are not assuring. In all of it there is no hint of regulation in the products of those manufacturers who buy finished iron and steel. Moreover, consumers of pig iron, of which Government buying is negligible, are not convinced that regulation in that market on the "one-price-for-all" principle will effect any marked readjustment. The suggested commandeering of plants charging more to private consumers than to the Government might not be easily applied to 400 blast furnaces, only a few of which by any chance would be sellers to the Government.

Though Government control of coal and coke output and prices is practically assured in the passing of the food bill, there is still the problem of insufficient labor to increase the coke output. The withdrawal of cars from the coke districts in view of labor scarcity there was overdone this week and spot coke advanced \$3 to \$4 a ton or to \$13 and \$14.

That pig iron output fell off further in July was chiefly due to coke shortage, with heat and humidity added. The decrease from June was 1200 tons a day, which was also the June decline from May. The July total was 3,342,438 tons, or 107,820 tons a day, against 3,270,055 tons in June, or 109,002 tons a day. Furnaces blowing out balanced those going in, so that 351 were active Aug. 1 as on July 1, with estimated capacity of 109,248 tons a day, compared with 111,755 tons a day one month previous.

The offering of sheet bars in the Central West at \$90 per ton and the sale of slabs at that price for August delivery, representing a decline of \$15, may indicate that the great increase in open-hearth steel capacity is beginning to tell—though this must be chiefly through larger use of scrap, as pig iron supply does not increase. Also the cutting down of finishing mill output because of hot weather has caused billets and sheet bars to accumulate, and

some of the freer supply came from the holding up of rollings by the export embargo.

The limiting of export licenses for plates and various other products to material for war purposes will result in some resale transactions, though there has been no great amount so far. Japan has taken 50 per cent of plate exports in recent months and has large orders on the books of the plate mills, on some of which rollings may be held up indefinitely.

Four weeks of restricted buying has developed a policy on the part of some jobbing interests, of working down stocks on hand against possible readjustments of prices, and there are evidences of a similar policy on the part of manufacturing consumers, some of whom have for months specified freely against contracts.

The early rolling of the 150,000 tons of rails for the Government's line in France will mean that domestic roads must wait for rails which were to be delivered in August and September.

There is a call from consumers of bars and other products for some assurance of stability in prices that will enable them to make their plans for the later months of the year. Implement makers are among the number. Concern over ability to get enough steel for full operations has subsided somewhat, apart from plates, but the possibility of price readjustments is a first consideration in every line of consumption. To a very considerable extent implement bar contracts on which shipments will be made in the remainder of the year were at prices ranging from 2.75c. to 2.90c.

Foreign inquiry for tin plate continues to come from India, Japan and South America. On 30,000 boxes for Japan as high as \$18.40 was offered, but supplies are being husbanded for domestic use.

Production of ferromanganese and spiegeleisen in July increased notably, going to 43,884 tons as against 30,829 tons in June and 37,701 tons in May. The situation as to British ferromanganese is tightening and domestic producers are holding more firmly for \$375 for the last quarter of this year and \$350 for the first half of 1918, while for early delivery \$400 is paid. Recent sales of ores from India have been at \$1.15 per unit.

Pittsburgh

PITTSBURGH, Aug. 7.

It is said that in July the railroads of the country eliminated about 1200 passenger trains representing about 16,000,000 train miles per year. The saving of fuel, lubricants and labor is expected to result in quicker movement of freight. There is no doubt that the movement of raw materials to, and finished materials from the blast furnaces and steel works is better now than it has been for some months. A shortage in cars developed last week in the Connellsville coke region, but there had been an oversupply of cars for which coke could not be found and the railroad diverted more cars from the coke regions than should have been done. The local steel market shows no new features. There is

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Aug. 8, 1917.	Aug. 1, 1917.	July 3, 1917.	Aug. 2, 1916.
No. 2, X, Philadelphia...	\$53.00	\$53.00	\$52.00	\$19.75
No. 2, Valley furnace...	53.00	53.00	55.00	18.25
No. 2, Southern, Cin'ti...	49.90	49.90	49.90	16.90
No. 2, Birmingham, Ala.	47.00	47.00	47.00	14.00
No. 2, furnace, Chicago*	55.00	55.00	55.00	19.00
Basic, del'd, eastern Pa...	50.00	50.00	50.00	19.00
Basic, Valley furnace...	52.00	52.00	52.00	18.00
Bessemer, Pittsburgh...	55.95	55.95	57.95	21.95
Malleable Bess., Ch'go*	55.00	55.00	55.00	19.00
Gray forge, Pittsburgh...	46.95	46.95	47.95	18.70
L. S. charcoal, Chicago...	58.00	58.00	57.00	19.75

Rails, Billets, etc., Per Gross Ton:	Aug. 8, 1917.	Aug. 1, 1917.	July 3, 1917.	Aug. 2, 1916.
Bess. rails, heavy, at mill	38.00	38.00	38.00	33.00
O-h. rails, heavy, at mill	40.00	40.00	40.00	35.00
Bess. billets, Pittsburgh...	90.00	100.00	100.00	43.00
O-h. billets, Pittsburgh...	90.00	100.00	100.00	45.00
O-h. sheet bars, P'gh...	90.00	105.00	105.00	45.00
Forging billets, base, P'gh	125.00	125.00	125.00	69.00
O-h. billets, Phila...	100.00	110.00	110.00	45.00
Wire rods, Pittsburgh...	95.00	95.00	95.00	55.00

Finished Iron and Steel

Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Iron bars, Philadelphia...	4.659	4.659	4.659	2.659
Iron bars, Pittsburgh...	4.75	4.75	4.75	2.50
Iron bars, Chicago...	4.50	4.50	4.50	2.35
Steel bars, Pittsburgh...	4.50	4.50	4.50	2.50
Steel bars, New York...	4.669	4.669	4.669	2.669
Tank plates, Pittsburgh...	9.00	9.00	9.00	3.50
Tank plates, New York...	10.169	10.169	9.169	3.669
Beams, etc., Pittsburgh...	4.50	4.50	4.50	2.50
Beams, etc., New York...	4.669	4.669	4.669	2.669
Skelp, grooved steel, P'gh	4.00	4.00	4.00	2.35
Skelp, sheared steel, P'gh	6.00	6.00	6.00	2.45
Steel hoops, Pittsburgh...	5.75	5.75	5.25	2.75

*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.

Sheets, Nails and Wire, Per Lb. to Large Buyers:	Aug. 8, 1917.	Aug. 1, 1917.	July 3, 1917.	Aug. 2, 1916.
Sheets, black, No. 28, P'gh	8.50	8.50	8.50	2.90
Sheets, galv., No. 28, P'gh	10.00	10.00	10.00	4.25
Wire nails, Pittsburgh...	4.00	4.00	4.00	2.50
Cut nails, Pittsburgh...	4.65	4.65	4.65	2.60
Fence wire, base, P'gh...	3.95	3.95	3.95	2.45
Barb wire, galv., P'gh...	4.85	4.85	4.85	3.35

Old Material, Per Gross Ton:

Iron rails, Chicago...	\$40.50	\$40.50	\$47.00	\$18.50
Iron rails, Philadelphia...	45.00	45.00	52.00	20.00
Carwheels, Chicago...	30.50	30.50	37.00	12.00
Carwheels, Philadelphia...	35.00	35.00	38.00	15.50
Heavy steel scrap, P'gh...	33.00	33.00	42.00	16.25
Heavy steel scrap, Phila...	31.00	32.00	40.00	14.75
Heavy steel scrap, Ch'go	29.00	29.00	36.00	15.25
No. 1 cast, Pittsburgh...	34.00	34.00	36.00	15.00
No. 1 cast, Philadelphia...	34.00	35.00	39.00	16.00
No. 1 cast, Ch'go (net ton)	23.00	27.00	30.50	11.50
No. 1 RR. wrot. Phila...	45.00	45.00	57.00	19.50
No. 1 RR. wrot. Ch'go (net)	33.50	33.50	40.00	15.25

Coke, Connellsville, Per Net Ton at Oven:

Furnace coke, prompt...	\$13.00	\$10.00	\$15.00	\$2.75
Furnace coke, future...	10.00	10.00	9.50	2.50
Foundry coke, prompt...	14.00	12.00	13.00	3.25
Foundry coke, future...	10.00	10.00	10.00	3.50

Metals,

Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Lake copper, New York...	28.00	29.00	31.75	26.25
Electrolytic copper, N. Y.	28.00	29.00	31.75	26.00
Spelter, St. Louis...	8.50	8.50	9.00	9.25
Spelter, New York...	8.75	8.75	9.25	9.50
Lead, St. Louis...	10.75	10.75	11.25	6.00
Lead, New York...	10.87 1/2	10.87 1/2	11.37 1/2	6.10
Tin, New York...	63.62 1/2	63.75	62.00	38.00
Antimony (Asiatic), N. Y.	15.00	15.00	19.00	12.50
Tin plate, 100-lb. box, P'gh	\$12.00	\$12.00	\$12.00	\$6.00

almost an entire absence of the wonderful activity in buying that prevailed until a month ago. Consumers evidently are not buying a pound of material they can possibly avoid, and manufacturers as well as consumers fully believe the apex in prices has been reached and that there may be severe declines in the near future, once the Government has announced its definite policy as to prices for finished steel products. There were no marked declines in prices in the past week, except on semi-finished steel, the market on billets and sheet bars showing a decidedly weaker tendency with prices off about \$10 per ton as compared with the highest market reached on these commodities. Pig iron held fairly steady, also scrap, but prompt blast furnace coke, due to shortage in cars and labor, has moved up \$3 to \$4 per ton. The report of the Federal Trade Commission on its investigations into steel costs is looked for at any time, and much interest is being shown as to just what cost figures will be given.

Pig Iron.—The local market is in very peculiar condition. No sales are being made by furnaces direct to consumers, but there is some resale iron that was loaded on the docks in New York for export shipment and had been turned back on account of not being able to get ships. One sale of this kind, involving about 2000 tons of Bessemer, was made at \$50, f.o.b. New York, equal to \$52.50, Pittsburgh. Possibly some Bessemer iron to come from one furnace outside the Valley district could be had at \$52 at furnace, equal to \$53.70, Pittsburgh, but the amount would be relatively small. On resales of Bessemer iron that have been made since the Government embargo was declared, prices have ranged from \$53 to \$55, Pittsburgh, but it is not believed that over 7000 to 8000 tons have been thus sold. These were also practically forced sales, and the prices ruling are not considered as the ruling market on Bessemer iron. None of the furnaces making Bessemer will sell at less than \$55, Valley, and one leading maker is holding Bessemer at \$57, Valley furnace. Nothing is doing in

basic, which is firm at \$52 to \$53 at furnace. Predictions are that after the hot weather is over, and finishing mills again are making normal output, there will be a decided shortage in the supply of pig iron, and that prices in 60 days from now may be higher than they are now.

Billets and Sheet Bars.—The great increase in new capacity for making open-hearth steel that is now in operation is commencing to tell, and in the past two weeks there has been a decided increase in the quantity of semi-finished steel available for the open market, in the forms of billets, sheet bars and slabs. New inquiry for steel is dull, but offerings of steel from sellers are coming out nearly every day, and for quick shipment. This week, several consumers of sheet bars that have regular sources of supply and are getting all the steel they can handle, have been offered sheet bars from other sources at \$90 per gross ton, f.o.b. Pittsburgh, and the steel was declined. This week a sale of 1500 tons of slabs for August and September delivery was made at \$90 per gross ton, f.o.b. Pittsburgh. Export shipments have been cut off. Output of steel has increased at least 2,000,000 tons per year since Jan. 1, and with steel mills making better deliveries to customers, the drop in prices of billets and sheet bars is readily explained. During the excessively hot weather of the past two weeks, the output of finishing mills was very materially cut down, and they have larger stocks of steel billets and sheet bars piled up in their yards than for a long time.

We now quote soft Bessemer and open-hearth billets at \$90 to \$95 and soft Bessemer and open-hearth sheet bars at \$90 to \$95, maker's mill, Pittsburgh or Youngstown. We quote forging billets at \$125 per ton for ordinary sizes and carbons, f.o.b. maker's mill.

Steel Rails.—New demand for new and rerolled light rails is not so active as three or four weeks ago, but prices are holding firm. The new light rail mills, and also the rerolling rail mills, are filled up for six to nine months ahead on all the rails they can possibly

turn out. No new orders are being placed for standard sections, aside from the Government contracts for the Allies. Prices on new light rails and standard sections are given on page 343.

Ferroalloys.—Demand for ferromanganese in the past week for prompt shipment was decidedly more active, and prices are firm. We note sales of 200 to 250 tons of 80 per cent domestic ferromanganese for prompt shipment, and 300 to 400 tons for delivery over remainder of this year at \$400 per gross ton, f.o.b. Pittsburgh. We quote 80 per cent domestic ferromanganese for prompt shipment at \$400; for delivery over remainder of this year, \$375 to \$400, and for first half of 1918, about \$375, at furnace. We continue to quote 18 to 20 per cent spiegeleisen at \$80 to \$85 per gross ton at furnace. Nearly all consumers of ferrosilicon are covered over the remainder of this year, and new buying is light. However, we note a sale of 700 tons of 10 per cent Bessemer ferrosilicon for delivery for first half in 1918 at \$95 per gross ton at furnace.

We quote 9 per cent Bessemer ferrosilicon at \$89, 10 per cent \$90, 11 per cent \$95, 12 per cent \$100, 13 per cent \$105, 14 per cent \$115, 15 per cent \$125, and 16 per cent \$135. We now quote 7 per cent silvery iron at \$84 to \$89, 8 per cent \$85 to \$90, 9 per cent \$86 to \$91, 10 per cent \$87 to \$92, 11 and 12 per cent \$88 to \$93. All f.o.b. maker's furnace, Jackson or New Straitsville, Ohio, and Ashland, Ky., these furnaces having a uniform freight rate of \$2 per gross ton for delivery in the Pittsburgh district.

Structural Material.—The new inquiry has been very light for some weeks, and not much new work is in sight. The McClintic Marshall Co. has taken 4000 tons for steel buildings for the new seamless-tube plant of the Pittsburgh Steel Products Company at Allenport, Pa. It is now estimated that about 8000 tons of steel will be needed for the proposed shipyards of the Federal Shipbuilding Co., in Hackensack Meadows, N. J. The plain material will be furnished by the Carnegie Steel Co., and will be fabricated by the American Bridge Co. Prices on structural material are given on page 343.

Plates.—No new orders for steel cars are coming out, except from the Government, which is said to have practically placed 17,000 cars for France. About 85,000 to 100,000 tons of plates and shapes will be needed. Domestic railroads are not ordering cars, knowing it would be months before they could get them, as the Government work will take preference. Steel car builders are getting only 40 to 50 per cent of the regular requirements of plates, and the outlook is that when the Government starts to place orders for ships the quantity of plates available for car plants will be less than now. The Chilean State Railways are reported in the market for 400 stock cars and 600 box cars. Prices on plates are holding strong, but new inquiry is not so active. We quote $\frac{1}{4}$ -in. and heavier sheared plates for delivery over remainder of this year at 8c. to 9c. at mill, while small lots from warehouse bring 12 to 13c. Pittsburgh.

Sheets.—Additional fair-sized orders for blue annealed, galvanized and Bessemer black sheets are being placed by the Government for prompt shipment. Tin plate and sheet mills through the sub-committee on sheets have furnished promptly all the sheets called for and expect to do so on future orders. New demand from the domestic trade is quiet, the general opinion being that the crest has been reached in prices, and that the market may be lower before long. It is true sheet mills are well sold up over remainder of this year, some having no sheets to offer before next year, but there has been a large increase in capacity in the past year, and this is able to take care of the demand. Prices are firm, but are not expected to be any higher. Mill prices for carload and larger lots to the domestic trade are given on page 343.

Tin Plate.—An annoying error crept into this report last week when it was stated that 10,000 boxes of bright tin plate for export had been sold at \$57.50 per base box; the correct price was \$17.50. On 30,000 boxes of tin plate for Japan, as high as \$18.40 per base box at maker's mill has been offered and refused by several mills, which state they could not possibly spare the plate in spite of the very attractive price. Foreign inquiry is still very heavy, coming from the Orient,

India and South America. Several leading mills explain that obligations on their books now will take their entire output of tin plate up to April of next year. It is likely large additions to capacity for making tin plate will be made over the next year or 18 months to meet the expected heavy export demand, to come not only during the war but for several years afterward. Sales of bright plates from stock are being made at \$13 to \$14 per base box. New demand from jobbers is not so active as it was a month or more ago. We quote bright plate from stock on current orders from \$12 to \$14 per base box, f.o.b. mill. New prices onterne plate, effective July 31, are given on page 343.

Iron and Steel Bars.—It is claimed that implement makers and other large consumers of steel bars are now fully covered over the remainder of this year. It is stated that prices range from 2.75c. to 2.90c. at mill, but in the Chicago district, lower figures were made. New demand for iron and steel bars is only fair, most consumers being covered, and specifications are quite active. The Government is buying moderate quantities of steel and reinforcing bars. It is not believed that prices on iron and steel bars will be any higher. Mill prices on carloads and larger lots to domestic customers are given on page 343.

Hoops and Bands.—New buying is slow, as consumers are covered over the remainder of this year, and at prices very much lower than are quoted on small lots for fairly prompt shipment. We quote hoops in small lots for prompt shipment at 6c. to 7c. and bands 5.50c. to 6c., extras on the latter as per the steel bar card.

Muck Bar.—There is no new inquiry, but prices on high grade muck bar made from all pig iron are ruling at about \$95 per ton at mill.

Wire Rods.—Export and domestic demand for rods is still quite heavy. Small lots of soft Bessemer and open hearth rods for export are being sold regularly at about \$100 per gross ton, at mill. To domestic consumers, soft rods are held at about \$95, and high carbon rods made from special steels bring as high as \$120. Prices on rods are given in detail on page 343.

Wire Products.—The recent order for 42,000 kegs of wire nails from the Government has been filled, and the order has been duplicated, about one-half going to the leading interest, and the remainder divided pro rata among the independent mills. New demand for wire nails and wire is quiet, and it is believed that the bulk of the new business being placed is going to the leading interest, as its prices are \$16 per ton less than are being quoted by the independent mills. So far none of the independent mills has reduced prices on account of the falling off in new business, and they say they will not do so. This is always the dull season in the wire trade, and the mills believe that late in September or early October there will be more active buying. Jobbers are not inclined to carry heavier stocks of nails than they need to fill their current orders. Independent mills have pretty well cleaned up all orders on their books taken at the \$3.20 price for wire nails, and \$3.25 for bright basic wire, and are now shipping out on contracts taken at the \$3.50 price for nails and \$3.55 for wire. The American Steel & Wire Co. prices on wire nails remains at \$3.20 base, and \$3.25 for bright basic wire per 100 lb. at mill. Prices quoted on wire and wire nails by the independent mills, but at which only a comparatively small amount of business has been placed, are given on page 343.

Shafting.—Very large quantities of shafting will be needed for the time fuses and the detonators for the 9,000,000 of 3-in. shells placed lately by the Government. In each of these time fuses, one piece of shafting measuring $1\frac{1}{2}$ in. to $1\frac{11}{16}$ in. is used, each piece weighing about 7 lb. Other heavy direct and indirect Government orders are being placed, and the output of the makers is well sold up over the remainder of this year. Specifications from the automobile trade have fallen off very much in volume, but from the screw stock machine trade are still quite active. Builders of aeroplane motors will be heavy users of shafting, and have already placed considerable orders. Discounts remain firm at 10 and 5 per cent off list.

depending on the order, while a few small lots are being sold at list.

Railroad Spikes and Track Bolts.—New demand for railroad spikes for the past several weeks has been very dull, and specifications are quiet. So far no part of the order for 100,000 kegs of standard spikes for the Government railroad in France has been placed. All the makers of spikes have their output well sold up for this year, and prices are ruling firm. As noted last week, makers of boat spikes, as a rule, are not quoting to the domestic trade, desiring to conserve practically their entire output over the next year to meet the Government boat building program. Track bolts are in only fairly heavy demand and local makers are sold up for this year. Prices on railroad spikes and track bolts are given in detail on page 343.

Cold Rolled Strip Steel.—It is estimated that the Government is taking 15 to 20 per cent of the output, both in hot rolled and cold rolled products. New demand from the domestic trade is not so active, consumers being pretty well covered over the next 60 to 90 days, and the belief is that the crest in prices has probably been reached.

On contracts, mills are quoting 9c. at mill, but on small current orders prices range from 10c. up to 12c. at mill. Terms are 30 days, less 2 per cent off for cash in 10 days when sold in quantities of 300 lb. or more.

Nuts and Bolts.—Makers are well sold up over remainder of this year. Jobbers are not anxious to carry large stocks, believing that prices will not be any higher. The hot weather and the shortage of labor is cutting down output to some extent, but deliveries of steel are better than for a long time. Discounts adopted on April 12, which give prices to the large trade in carloads, advances being charged for small lots, are given on page 343.

Wrought Pipe.—The sub-committee on tubular products has been able to distribute and get prompt delivery for all the wrought steel pipe so far required for the different Government cantonments. The committee recently received Government specifications for about 4300 tons of pipe for steam heating for the cantonments. This has been distributed pro-rata among the different manufacturers, and it will be shipped as fast as required. About 500,000 ft. of 6-in. pipe has already left the mills, together with a smaller quantity of other sizes. Pipe manufacturers have all given these orders preference, though difficult at times to secure the steel. There will be no trouble about the Government securing pipe as fast as needed, on account of the large capacity of the pipe mills of this country. The current demand for lap-weld iron and steel pipe is not so active as it has been, business from jobbers and from consumers showing a falling off, due largely to the uncertainty of Government regulation of prices. However, the mills are sold up on lap-weld iron and steel pipe over the remainder of this year, and some have large orders for 1918 delivery. New demand for butt-weld iron and steel pipe is quiet, partly due to the large falling off in building operations all over the country, on account of the high prices ruling for material and labor. Mills can fill new orders for butt-weld pipe in six to eight weeks from date of order. Discounts on steel pipe, as adopted on May 1, in effect by most of the independent mills, and on iron pipe as adopted on July 1, are given on page 343.

Boiler Tubes.—Some difficulty will likely be encountered by the Government in securing promptly boiler tubes to be required later on for the merchant marines and other ships. Tube mill order books are filled up for a year to 18 months, and while they will give preference to Government orders, capacity is not relatively so large as for making pipe. Several large makers of steel tubes have been furnishing close to 50 per cent of their output to the Government for some time. This also applies to seamless steel tubing, the National Tube Co. and the Pittsburgh Seamless Tube Co., both having been furnishing large quantities for some months. These two concerns have their output of seamless steel tubes sold up for more than a year ahead. The Pittsburgh Steel Products Co. has started work on a new seamless tube plant at Allenport, Pa., facing the Monongahela River, which will be larger

than its present Monessen plant, which has an annual capacity of 60,000 tons of seamless steel tubes, ranging from 1-in. to 6-in. in diameter. Heavy premiums are being paid for fairly prompt deliveries of iron and steel tubes, consumers willing to pay practically any prices. Nominal discounts on iron and steel tubes, adopted Nov. 1, but which show prices very much below the actual market, are given on page 343.

Old Material.—The local scrap market shows no change. There is still almost an entire absence of new buying, and the market keeps marking time. Prices held steady in the past week, and are no lower. The only concern buying heavy melting steel scrap is an open-hearth steel plant in Central Ohio; in the past week or two, this has bought probably 35,000 tons of heavy steel melting scrap at \$34 to \$35, delivered, the freight rate from the Pittsburgh district being \$1.20 per gross ton. Sometime ago there was a heavy demand in this district for borings and turnings for blast furnace use, but this has also stopped. The same is true of low phosphorus melting stock, this material having been in very active demand until about two weeks ago. Dealers report they are not yet trying to force sales of scrap under present conditions, taking the stand that it would be useless to do so, as consumers are not in a buying mood. Dealers are afraid to go short, feeling that an upward turn in prices may come at any time. They claim that prices of scrap today are cheap, and as soon as demand starts up again, the market will be higher. Several large dealers in this district report they have not made a large sale in the past week. Dealers quote for delivery in Pittsburgh and other consuming points that take Pittsburgh freight rates, per gross ton, as follows:

Heavy steel melting scrap, Steubenville, Follansbee, Brackenridge, Monessen, Midland and Pittsburgh delivered	\$33.00 to \$34.00
No. 1 foundry cast	34.00 to 35.00
Rerolling rails, Newark and Cambridge, Ohio; Cumberland, Md., and Franklin, Pa.	40.00 to 41.00
Hydraulic compressed sheet scrap	28.00 to 29.00
Bundled sheet scrap, sides and ends, f.o.b. consumer's mill, Pittsburgh district	23.00 to 24.00
Bundled sheet stamping scrap	21.00 to 22.00
No. 1 railroad malleable stock	29.00 to 30.00
Railroad grate bars	18.00 to 19.00
Low phosphorus melting stock	46.00 to 48.00
Iron car axles	47.00 to 50.00
Steel car axles	47.00 to 50.00
Locomotive axles, steel	55.00 to 60.00
No. 1 busheling scrap	26.00 to 27.00
Machine-shop turnings	18.00 to 19.00
Cast-iron wheels	33.00 to 34.00
Rolled steel wheels	37.00 to 38.00
*Sheet bar crop ends	44.00 to 45.00
Cast-iron borings	19.00 to 20.00
No. 1 railroad wrought scrap	38.00 to 39.00
Heavy steel axle turnings	24.00 to 25.00
Heavy breakable cast scrap	27.00 to 28.00

*Shipping point.

Coke.—The supply of cars all last week was very short, averaging only about 45 per cent. On one day it was only 10 per cent, but on other days ran up to 65 and 70 per cent. This served to hold up prices on prompt furnace coke, but the fact that during the hot weather coke workers worked only two or three days on the average, probably had more to do with putting up prices than the failure of the car supply. Early last week spot furnace coke sold at \$10 per ton at oven, but this was the low mark, and prices steadily went up in the remainder of the week, and also in the first part of this week. Best grades of prompt furnace coke are now held at \$13 to \$14 per net ton at oven for shipment to the two Valleys, while coke for Eastern blast furnaces, loaded on Pennsylvania Railroad cars, is held as high as \$15 per net ton at oven. Nothing is doing in contracts, coke operators still believing that the Government will regulate prices on both coal and coke. Furnaces are content to buy whatever surplus coke they need over regular contracts at prices ruling from day to day. The demand for prompt blast furnace coke is active, shipments not being heavy enough to give the furnaces all they need. The supply of labor, particularly coke drawers, is short, and operators who have hand-drawn ovens are often unable to get their coke drawn promptly. We now quote best grades of blast furnace coke for prompt

shipment to Valley furnaces at \$13 to \$14, and to Eastern furnaces shipped over the Pennsylvania Railroad at \$14 to \$15 per net ton at oven. We quote best grades of 72-hr. foundry coke for prompt shipment at \$13 to \$14 per net ton at oven. A meeting of coal and coke operators is to be held at Deer Park, Md., on Friday and Saturday of this week, to talk over the situation as to prices. The Connellsville *Courier* gives the output of coke in the upper and lower Connellsville regions for the week ended July 28 as 367,355 tons, an increase over the previous week of 5207 tons.

Chicago

CHICAGO, Aug. 6.

Interest is centered to a large degree in the consequences which will follow compliance by the Division of Export Licenses of instructions to grant no export licenses for plates, shapes, iron and steel bars, pig iron, scrap, etc., except where it is shown they are to be used for war purposes. Export companies have placed a great deal of business which cannot be handled despite confirmed credits. The order has resulted, in one mill, at least, in what is termed a "nasty mess," inasmuch as it is undesirable to roll what cannot be shipped. Neither is it desirable to let the material accumulate when domestic demand is so heavy. In the opinion of some the market for the products so restricted may be rendered easier as the result of the greater availability of material. The leading interest continues to take orders from the Government only, and other producers are taking but little or no new business. An order for 5000 kegs of spikes for France, presumably in connection with the recent order for 150,000 tons of rails, has been taken by a Western mill. Government orders are coming out heavily, but little is being said of them. Consumers of bars and other products are anxious for some assurance of stability in prices which would enable them to enter the future with greater certainty. The president of a large agricultural implement company believes this the most pressing question before manufacturers. Not a single letting for fabricated steel is announced this week. Sheets appear to have recovered from their recent weakness, and to have grown stronger, a sale of 300 tons of block sheets at 10.50c. being recorded. Pig iron is unchanged, but several grades of scrap show further declines. Dealers are of the opinion, however, that the bottom has been reached. Consumers are not buying here, but some strength is imparted to the market by the activity in the East where dealers appear to be buying to cover commitments.

Ferroalloys.—Eighty per cent ferromanganese for delivery in the first half of 1918 can be had at \$350, delivered, and for the latter part of this year at \$375. Strictly prompt is held at around \$400.

Plates.—Narrow plates for domestic consumption can be had at 10c. to 11c., tank plate quality, delivery in sixty to ninety days. Practically all of the makers are out of the market in wide plates. It is not unlikely that the stricter ruling of the Government with regard to export licenses may bring about some ease in the market by making plates more available for domestic use. The principal effect so far is to create more or less confusion at the mills, inasmuch as in some instances exporters who placed orders have not yet obtained licenses and may not be able to do so, their orders not being predicated on war needs. Where licenses have not been obtained, the railroads are not willing to carry material to the seaboard. Even the slowness of the Government in issuing licenses, prior to the last drastic order, caused one mill to accumulate 5000 tons. Jobbers to-day advanced their quotation.

For Chicago delivery out of stocks, jobbers quote 10c.

Pig Iron.—From every point of view the market is quiet and devoid of feature. As was the situation a week ago, the chief concern of the iron trade lies in making deliveries against contracts on its books. The Northern producers quote \$55, furnace, for No. 2 foundry, basic and malleable Bessemer, any delivery this side of next July. Southern makers quote \$50, Birming-

ham, for this year, and \$45 to \$48, for the first half. The few lots of prompt iron which have come on the market have brought full prices when they have been taken. Charcoal iron is unchanged. Copper-bearing low phosphorus is about \$90, Chicago, and there is practically no activity to report, an inquiry for 1500 tons having been withdrawn. It is regarded as not improbable that the action of the Government in refusing export licenses except where iron is destined for war consumption may later have some effect in easing the market, but no influence has yet been felt, on the contrary, there now appears to be none too much iron for domestic consumption. The following quotations are for iron delivered at consumers' yards, except those for Northern foundry, malleable Bessemer and basic irons, which are f.o.b. furnace, and do not include a switching charge averaging 50c. per ton:

Lake Superior charcoal, Nos. 1 to 4.....	\$58.00
Lake Superior charcoal, Nos. 5 and 6,	
Scotch and No. 1 soft or special.....	60.50
Northern coke foundry, No. 1.....	55.50
Northern coke foundry, No. 2.....	55.00
Northern coke foundry, No. 3.....	54.50
Northern high-phosphorus foundry.....	55.00
Southern coke No. 1 f'dry and 1 soft.....	55.00
Southern coke No. 2 f'dry and 2 soft.....	54.00
Malleable Bessemer.....	55.00
Basic.....	55.00
Low-phosphorus.....	\$90.00 to 93.00
Silvery, 8 per cent.....	82.75

Structural Material.—Again a week has passed without a single structural letting to be announced, although in miscellaneous lots one maker reports a fair business. Delivery this year commands 6.189c., Chicago, although it is likely this figure might be shaded a little. No car orders are reported. The largest producers of shapes are entirely out of the market.

For material out of warehouse jobbers quote 5c.

Bars.—Large consumers of bars, and of other products, are uncertain as to their future buying because of the uncertainty which confronts them. If the agricultural implement makers, for instance, were convinced that the market would pursue a reasonably stable course some of them would place orders. Mild steel bars are unchanged at 4.689c., Chicago. Rail carbon bars, quoted at 4.50c., Chicago, have been a little more active in the last two or three days. Iron bars range from 4.50c. to 5c., Chicago.

We quote prices for Chicago delivery as follows: Soft steel bars, 4.50c.; bar iron, 4.50c. to 5c.; reinforcing bars, 4.50c., base, with 5c. extra for twisting in sizes 1½ in. and over and usual card extras for smaller sizes; shafting list plus 5 per cent to plus 10 per cent.

Wire Products.—No change from a week ago can be reported. The leading interest continues to fill specifications at its 3.20c., Pittsburgh base, while independents ask 4c. and over. We quote on the basis of 4c., Pittsburgh, for nails, per 100 lb., to jobbers, as follows:

Plain fence wire, Nos. 6 to 9, base, \$4.189; wire nails, \$4.189; painted barb wire, \$4.339; galvanized barb wire, \$5.039; polished staples, \$4.339; galvanized staples, \$5.039; all Chicago, carload lots.

Sheets.—The slightly easier tendency which was apparent in sheets a few days ago seems to have disappeared, one indication of which lies in the action of an Ohio maker in withdrawing all quotations last Saturday, requesting its representatives to submit all inquiries to the mill. Prices have stiffened a little, several makers now asking 9.189c. for both No. 10 blue annealed and No. 28 black. Galvanized are nominally 10.50c. to 11c., Pittsburgh, or 10.689c. to 11.189c., Chicago. A lot of 300 tons, delivery in 60 to 90 days, was purchased at 10.50c., but this price is over the general market. Jobbers' quotations are unchanged.

We quote for Chicago delivery out of stock, regardless of quantity, as follows: No. 10 blue annealed, 10c.; No. 28 black, 10c., and No. 28 galvanized, 11.50c.

Rails and Track Supplies.—A Western mill has received an order for 5000 kegs of spikes for export to France, presumably in connection with the Government purchase of 150,000 tons of rails reported a week ago. The price is not announced, but it is presumed to be in line with those to be paid by the Government for other track materials. Specifications for splice bars have

been fair. The quotations for spikes and track bolts show considerable variance, the leading interest holding down its prices, although at the same time it is not taking any but Government business.

Quotations are as follows: Standard railroad spikes, 4.25c. base, small spikes, 4.50c. base; track bolts with square nuts, 5.25c., all in carloads, Chicago; tie plates, \$70 to \$90 f.o.b. mill, net ton; standard section Bessemer rails, Chicago, \$38. mill; open hearth, \$40; light rails, 25 to 45 lb., \$65; 16 to 20 lb., \$66; 12 lb., \$67; 8 lb., \$68; angle bars, 3.25c., base.

Bolts and Nuts.—Quiet in new business is pronounced, but the makers have more than enough in hand to keep them busy. For prices and freight rates see finished iron and steel prices, f.o.b. Pittsburgh, page 343.

Store prices are as follows: Structural rivets, 5.50c.; boiler rivets, 5.60c.; machine bolts up to $\frac{3}{8}$ x 4 in., 40-10; larger sizes, 35-5; carriage bolts up to $\frac{3}{8}$ x 6 in., 40-2 $\frac{1}{2}$; larger sizes, 30-5; hot pressed nuts, square, \$3, and hexagon \$3 off per 100 lb.; lag screws, 50 per cent off.

Cast-Iron Pipe.—Akron, Ohio, it is expected, will to-day place 2500 tons. The Whitefish Bay, Wis., requirement of 400 tons went to a contractor. The Government continues to buy in liberal quantities. In addition to previous purchases, it has taken 2000 tons for Fort Riley, Kan. Quotations are unchanged.

Quotations per net ton, Chicago, are as follows: Water pipe, 4 in., \$68.50; 6 in. and larger, \$65.50, with \$1 extra for class A water pipe and gas pipe.

Old Material.—In this market there is no active buying on the part of consumers, but prices are supported, to some extent, by the strength of the Eastern market, where there appears to be considerable effort on the part of dealers to cover their commitments. Local dealers believe that quotations are near the bottom, partly because of their policy of not pressing material for sale. The Illinois Central Railroad refuses to let its coal cars leave the Chicago switching district, and it is understood other lines will follow this example. A fair list has been issued by the Union Pacific, and small ones by the C. & E. I., Illinois Central, Pere Marquette and Big Four. We quote for delivery at buyers' works, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Old iron rails	\$40.50 to \$41.50
Relaying rails	50.00 to 55.00
Old carwheels	30.50 to 31.50
Old steel rails, rerolling	39.00 to 40.00
Old steel rails, less than 3 ft.	39.00 to 40.00
Heavy melting steel scrap	29.00 to 30.00
Frogs, switches and guards, cut apart	29.00 to 30.00
Shoveling steel	26.00 to 27.00
Steel axle turnings	21.00 to 22.00

Per Net Ton	
Iron angles and splice bars	\$38.00 to \$39.00
Iron arch bars and transoms	41.00 to 42.00
Steel angle bars	30.00 to 31.00
Iron car axles	40.00 to 41.00
Steel car axles	40.00 to 41.00
No. 1 railroad wrought	33.50 to 34.50
No. 2 railroad wrought	30.50 to 31.00
Cut forge	30.00 to 31.00
Pipes and flues	21.00 to 22.00
No. 1 busheling	25.00 to 26.00
No. 2 busheling	18.00 to 19.00
Steel knuckles and couplers	41.00 to 42.00
Steel springs	42.50 to 43.00
No. 1 boilers, cut to sheets and rings	20.50 to 21.00
Boiler punchings	31.00 to 32.00
Locomotive tires, smooth	40.00 to 41.00
Machine-shop turnings	16.00 to 17.00
Cast borings	16.50 to 17.50
No. 1 cast scrap	23.00 to 24.00
Stove plate and light cast scrap	17.50 to 18.00
Grate bars	17.50 to 18.50
Brake shoes	17.50 to 18.50
Railroad malleable	29.00 to 30.00
Agricultural malleable	23.75 to 24.75
Country mixed scrap	16.00 to 16.50

Philadelphia

PHILADELPHIA, Aug. 6.

Pressure for deliveries is stronger, if anything, in all lines of iron and steel, but new business is slow except for plates, where the most congestion exists. There is a growing feeling here that there will be no drastic Government action with regard to price fixing in civilian business, but no increase of orders is accompanying that conviction. There is certainly no worry over the lack of new business; mills and furnaces are sold so far ahead that the opportunity to take a breathing spell and to get a clearer view of the whole situation

is being welcomed. The President's embargo on steel and iron exports has had an effect in some lines, but the actual amount of resale material available in this market as a result of the export embargo is apparently small and certainly has had no effect on prices.

Pig Iron.—Firm conditions prevail, despite the light inquiry and the comparatively trifling sales. One large house reports that for the last two weeks transactions have not been 25 per cent of the average. There is no apparent disposition on the part of buyers to place orders running into the third quarter of 1918, and as many furnaces are sold up for virtually all of the first half of 1918, it is likely that business will lag for the remainder of August. The call for prompt shipment of iron against contract is insistent, while actual furnace stocks are at their minimum. Some small lots of Eastern Pennsylvania No. 2 X have sold in the week at \$53 to \$55 furnace. Other small transactions in Southern No. 2, first-half delivery, are reported on a basis of \$49, Birmingham. Virginia iron has been inactive and in the standard grades maintains last week's quotations as the nominal prices, though some Virginia iron of high silicon content has changed hands at the equivalent of \$57.50 Philadelphia. Steel-making irons are quiescent, with standard low phosphorus nominal at \$90 and basic nominal at \$50 to \$52. For prompt shipment, delivery in buyers' yards, standard brands are quoted as follows:

Eastern Pa. No. 2 X foundry	\$53.00 to \$55.75
Eastern Pa. No. 2 plain	52.75 to 55.25
Virginia No. 2 X foundry	54.25 to 55.25
Virginia No. 2 plain	53.75 to 54.75
Basic	50.00 to 52.00
Standard low phosphorus	90.00

Coke.—Foundry coke is quoted to-day at \$13 to \$14, with furnace coke ranging from \$10.25 to \$11 for spot fuel.

Ferroalloys.—Ferromanganese maintains its level of \$400 for prompt delivery, with makers apparently inclining toward stiffer prices and with some mention of \$420 as their idea. While no sales have been recorded higher than \$400 there has been none reported below that figure, though for last quarter delivery it is possible to buy at \$375, with \$350 asked for 1918. Spiegeleisen is none too strong at \$80 furnace, with \$82.50 asked for small lots. Fifty per cent ferrosilicon is somewhat easier at \$225 for prompt and \$125 to \$130 for first quarter.

Billets.—Resale billets have been offered in this market by an exporting house, which has been quoted \$90 on about 2000 tons of open-hearth billets, 6 x 6 in., carbon 0.10 to 0.15 per cent. It is reported here that the Pennsylvania Railroad has purchased upward of 1500 tons of forging billets, 1918 delivery, at \$125.

Sheets.—Mill capacity continues to be more or less taken up with Government work, but civilian business which can be accommodated is taken on a basis of 8 $\frac{1}{2}$ c. to 8 $\frac{3}{4}$ c. for blue annealed; 8c. for black and 10 $\frac{1}{4}$ c. to 11c. for galvanized.

Iron and Steel Bars.—Moderate inquiry is reported in concrete bars, which are being held by makers at 4 $\frac{3}{4}$ c., while soft steel bars are quoted at 5c. to 5 $\frac{1}{4}$ c., Pittsburgh, according to tonnage. Makers of bar iron report extra heavy inquiry as a result of the Government's shipbuilding program, and inquiries of approximately 20,000 tons are reported on wooden ships. Mills are holding bar iron at 5c. to 5 $\frac{1}{4}$ c., Pittsburgh, shipment at mill convenience.

Structural Material.—Additional Government specifications are reported by mills which have not yet reached the maximum of their allotments, and the path of the civilian with orders on the books is getting thornier. New work is conspicuous by its absence in this territory, and prices on available shapes run anywhere from 5 $\frac{1}{4}$ c. to 6c. The chief interest in the structural field just now is the possibility of renewed work on the Broad Street subway, the three pending contracts on that enterprise, covering six sections, calling for about 25,000 tons of steel. As the bids were presented nearly six months ago, when prices were much lower than they are now, the general contractors have requested concessions from the city, and a meeting with

the Mayor is expected this week. Four of the six sections, according to the original design, were to have been fabricated by the McClintic-Marshall Co., and it is understood that the bulk of the steel was to have been rolled by the Bethlehem Steel Co. The remaining steel work, for two sections, was to go to the American Bridge Co. Pending the conference with the general contractors and the city solicitor, the mayor, it is understood, will not sign the awards.

Plates.—Specifications have been very heavy. It is said that including Government specifications for plates, such as might be used on destroyers or similar light craft, the total was several hundred per cent of the full capacity of the mills for the week. Car, locomotive and ship plates were included, as well as an inquiry for 1000 tons of tank plates for export which was turned down with other export inquiries. New business placed aggregated about 4000 tons, while the business, both export and domestic, which was rejected, ran into many thousands of tons. Government orders, which are very heavy, continue to get preference, which means virtually no promise of shipments to ordinary purchasers under ten or twelve months, with the likelihood of a longer delay if Government interests require it. There is considerable bridge work in the market and bridge companies are using 10.159c., base Philadelphia, or its equivalent, in making estimates, with several orders placed on this basis. Minimum quotations on plates remain unchanged, 10.159c., Philadelphia, for tank and 12½c. mill for ship steel.

Old Material.—Mills which were thought to be showing interest in scrap metal when the export embargo was announced have relapsed into their old waiting attitude and the market is decidedly quiet. Though trading is almost at a standstill there seems to be a general desire of short interests to cover, while holders of actual material are not inclined to sell. Somewhat softer prices are quoted in a number of lines, but in the absence of real transactions the figures are largely nominal. For material delivered in Eastern Pennsylvania, the prices per gross ton are:

No. 1 heavy melting steel.....	\$31.00 to \$32.00
Steel rails, rerolling.....	43.00 to 45.00
Low phosphorus, heavy melting.....	45.00 to 50.00
Old iron rails.....	45.00 to 47.50
Old carwheels.....	35.00 to 38.00
No. 1 railroad wrought.....	45.00 to 50.00
No. 1 forge fire.....	22.00 to 23.00
Bundled sheets.....	22.00 to 23.00
No. 2 busheling.....	16.00 to 17.00
Machine shop turnings (for blast furnace use).....	19.00 to 20.00
Machine shop turnings (for rolling mill use).....	22.00 to 23.00
Cast borings (for blast furnace use).....	19.00 to 20.00
Cast borings, clean.....	23.00 to 25.00
No. 1 cast.....	34.00 to 37.00
Grate bars.....	21.00 to 22.00
Stove plate.....	22.00 to 23.00
Railroad malleable.....	32.50 to 35.00
Wrought iron and soft steel pipe (new specifications).....	31.00 to 33.00

Cleveland

CLEVELAND, Aug. 7.

Iron Ore.—Lake ore shipments in July amounted to 10,241,633 gross tons, setting a new record. The previous high mark was in August, 1916, when the ore fleet moved 9,850,140 tons. Shipments for July a year ago were 9,750,157 tons. Shipments to Aug. 1 were 26,376,768 tons, or 2,988,956 tons less than in the corresponding period a year ago, the falling off being due to the light movement early in the season resulting from the late opening of navigation caused by ice conditions. The July movement was surprisingly large, considering the long delays caused to boats at lower Lake ports while waiting for cars. It is expected that another new record will be established in August. Information gathered during the past few weeks and presented at a meeting of the pig iron, ore and coal committees of the advisory commission of the Council of National Defense held in Cleveland, Aug. 1, which was presided over by Chairman H. G. Dalton, indicates that the Lake Superior iron ore requirements of the inland blast furnaces for the year will be 34,000,000 tons, that the Eastern blast furnaces will require 4,000,000 tons of Lake ore, and the Lake front furnaces will require

20,000,000 tons. It is possible that the inland furnaces will be allowed 2,000,000 tons additional, making the probable requirements from 58,000,000 to 60,000,000 tons. Shipments by water in 1916 were 64,734,198 gross tons. However, it was predicted early in the season that the 1916 record would not be reached this year, one of the reasons for this being that there were not such large stock piles of ore at the mines at the beginning of the season of navigation as there were early last year. The figures showing the probable ore requirements for this year indicate that there is not cause for the fear of an ore shortage that has been expressed in some quarters. The problem that confronts the iron and steel industry and the various committees is one of car supply rather than a scarcity of ore or lack of sufficient vessel capacity to move it. Because of this situation it is stated that the committees will make no attempt to curtail the amount of ore shipped to Lake front furnaces unless conditions later should warrant some restrictions in the amount of ore going to Lake front consumers in order to speed up the Lake movement of coal shipped to the Northwest. We quote prices as follows, delivered lower Lake ports: Old range Bessemer, \$5.95; Mesaba Bessemer, \$5.70; old range non-Bessemer, \$5.20; Mesaba non-Bessemer, \$5.05.

Pig Iron.—While some small lots of No. 2 foundry and malleable pig iron are being sold by Cleveland furnace interests, the total tonnage booked in the past week has been unimportant. One large interest took on only a total of 5000 tons of both grades in the past seven-day period. These sales, which were made at \$55, furnace, involved largely deliveries for this year, buyers seemingly having lost some of their former apprehension over ability to secure iron for delivery next year. Steel-making irons have not been active here for several weeks, but Cleveland furnaces are not inclined to accept \$52, Valley, as the prevailing basic iron price, two of them declaring they will not sell under \$54. The low-phosphorus iron market is quiet, with no inquiry now active, and the quotation prevails at \$82 to \$85, Pittsburgh. All melters of iron in northern Ohio are anxious to secure regular shipments of metal, and so far the car service has been fairly satisfactory. We quote, f.o.b. Cleveland, as follows:

Bessemer.....	\$55.95
Basic.....	\$53.30 to 55.30
Northern No. 2 foundry.....	55.30
Southern No. 2 foundry.....	49.00 to 54.00
Gray forge.....	50.95 to 52.95
Ohio silvery, 8 per cent silicon.....	88.62
Standard low phos. Valley furnace.....	55.00

Coke.—The rapid advance in the Connellsville prompt furnace coke price since Friday has been somewhat of a surprise to Cleveland consuming interests. They had previously been offered furnace fuel for August delivery at \$10 and \$10.50 per net ton at ovens, but had shown no anxiety to cover. Now the quotation has jumped \$2 a ton, and the lowest quotation heard to-day was \$12, ranging up to \$12.50, ovens. Some sales have been made in small lots of several carloads to-day at \$12.50, ovens. Foundry coke has been hard to get, that is, standard quality coke, and as high as \$14, ovens, has been paid. The car supply again is causing anxiety, and this week it has become much tighter than usual. Whether the new high price will be more than temporary is a question, but since extraordinary efforts are being made to bring in more lake cargo coal, it is suspected the coke pinch here may continue for some days.

Finished Iron and Steel.—Sales have been of small proportions the past week, largely for odds and ends. Some northern Ohio implement makers have sought to buy additional steel bars for next year, but have not been encouraged. Steel bars are being sold at 4c. by one mill for delivery in the fourth quarter of this year, but only to old customers. Shapes are being sold at 4½c. by the same mill, also to old customers. But the shape trade has dwindled to small proportions. A Canton, Ohio, manufacturer, using cold rolled material has been unable to secure additional tonnage, except at prices it considered prohibitive, and has withdrawn from the market to prod up mills previously

slow in making deliveries to it. Bar iron is selling in odd lots from time to time around 4.75c. to 5c. Steel sheet inquiry for first quarter of next year has not been satisfied as yet. Local jobbers have again advanced quotations to the mill basis.

Semi-Finished Steel.—While some northern Ohio sheet mills have been trying to sound out the market for sheet bars for fourth-quarter delivery, manufacturers have put aside such inquiry with the declaration that it is too soon to figure. Sheet mills in this district appear to be so well covered for the present that they may be able to carry over into the fourth quarter fairly good tonnages of sheet bars, in some cases. Intimation has been given by sheet bar makers that fourth quarter prices may be around the third quarter price, which averaged \$105 to \$110, mill.

Old Materials.—No more activity has developed here the past week in iron and steel scrap than has been apparent in the previous two weeks. Sales have been infrequent, and confined largely to dealings between brokers. No changes in quotations have been made, and we quote, f.o.b. Cleveland, as follows:

Per Gross Ton	
Steel rails	\$31.00 to \$32.00
Steel rails, rerolling	45.00 to 46.00
Steel rails, under 3 ft.	39.00 to 40.00
Iron rails	43.00 to 44.00
Steel car axles	50.00 to 52.00
Heavy melting steel	32.00 to 33.00
Carwheels	32.00 to 33.00
Relaying rails, 50 lb. and over	50.00 to 55.00
Agricultural malleable	24.00 to 25.00
Railroad malleable	31.00 to 32.00
Light bundled sheet scrap	24.00 to 25.00

Per Net Ton	
Iron car axles	\$47.00 to \$49.00
Cast borings	17.50 to 18.00
Iron and steel turnings and drillings	17.00 to 17.50
No. 1 busheling	25.00 to 26.00
No. 1 railroad wrought	42.00 to 43.00
No. 1 cast	29.00 to 30.00
Railroad grate bars	21.50 to 22.00
Stove plate	20.00 to 21.00

Buffalo

BUFFALO, Aug. 7.

Pig Iron.—The furnaces of the district almost without exception report a very quiet market with an exceedingly limited amount of business transacted either for current or forward deliveries. The reason given is that there is no current or immediate future product available, with the one exception of the Burden stack at Troy, controlled by Buffalo interests, and now being put in repair for operation. This continues to contract for considerable business for delivery over the remainder of the year and forepart of 1918. This interest reports the sale of about 10,000 tons during the week at current prices. The initial price of \$50 per ton, quoted for the purpose of obtaining a backlog of orders, was withdrawn about two weeks ago. One producer reports quite a large call for prompt and last quarter shipment of malleable iron, because of accumulated demand which furnaces have been unable to supply. Some car shortage is being experienced, causing delay in some instances in the forwarding of furnace shipments. Prices remain at about the same level as last week, the range for 1918 first half delivery being as follows, f.o.b. furnace, Buffalo:

High silicon irons	\$55.00 to \$56.00
No. 1 foundry	54.00 to 55.00
No. 2 X foundry	53.00 to 55.00
No. 2 plain	52.00 to 54.00
No. 2 foundry	51.00 to 53.00
Gray forge	51.00 to 53.00
Malleable	54.00 to 55.00
Basic	54.00 to 55.00
Lake Superior charcoal, f.o.b. Buffalo	55.00 to 60.00

Finished Iron and Steel.—Shipment of finished products for July fell off considerably as compared with June, due to some extent to the extremely hot weather. Interest now centers in Government specifications, which are beginning to come through in larger volume. Local sales offices are finding it difficult, they state, to convince their regular trade that Government preference is a reality. A good many users of steel products of various kinds apparently feel that it is a term that is being employed to cover delays in shipments on their contracts. The demand for tin plate is heavier than

ever, and it is understood that the minimum price on tin plate "accumulations" has advanced to \$12 per base box. Specifications for standard railroad spikes are coming in freely. Larkin & Sangster, Buffalo, have the general contract for the Galveston Causeway, Galveston, Tex., requiring 2700 tons of reinforcing bars to be supplied by the Jones & Laughlin Steel Co. with the Diamond bars. The F. N. Burt Co., manufacturers of paper boxes, Buffalo, will require 200 tons of reinforcing bars and a small tonnage of structural steel. Austin & Co., Cleveland, for the Curtiss Aeroplane & Motor Corporation, has sublet the 4000 tons of structural steel work to the Buffalo Structural Steel Co., the Hamilton Bridge Co., Hamilton, Ont., and the Blaw-Knox Co., Pittsburgh. The steel for the Buffalo Structural Steel Co.'s portion will be furnished by the Lackawanna Steel Co. The King Bridge Co., Cleveland, has the contract for the Symington gun works, Rochester.

Old Material.—Heavy sales of carwheels have been made during the past week, for Pittsburgh delivery, on the basis of \$36, Buffalo. A considerable tonnage of heavy melting scrap has also been under inquiry by a local user in the latter part of the week, for delivery over the next three months. Railroad malleable scrap has been in better demand and the price has advanced to \$33 to \$34 per ton. In other commodities there has been no special trading, with no change in the price list. The embargoes in the Pittsburgh and Valley districts, mentioned last week, remain in effect and are holding back shipments for these points. We quote dealers' asking prices, per gross ton, f.o.b., Buffalo, as follows:

Heavy melting steel	\$33.00 to \$34.00
Low phosphorus	45.00 to 48.00
No. 1 railroad wrought	43.00 to 45.00
No. 1 railroad and machinery cast	30.00 to 31.00
Iron axles	45.00 to 50.00
Steel axles	45.00 to 50.00
Carwheels	35.00 to 36.00
Railroad malleable	33.00 to 34.00
Machine shop turnings	18.00 to 19.00
Heavy axle turnings	26.00 to 27.00
Clean cast borings	20.00 to 21.00
Iron rails	43.00 to 44.00
Locomotive grate bars	20.00 to 21.00
Stove plate	20.50 to 21.00
Wrought pipe	30.00 to 31.00
No. 1 busheling scrap	29.00 to 30.00
No. 2 busheling scrap	20.00 to 21.00
Bundled sheet stamping scrap	21.00 to 21.50

Cincinnati

CINCINNATI, Aug. 8—(By Wire).

Pig Iron.—Comparison with conditions as existing in the first week of August last year made by different pig-iron houses shows that the unfilled tonnage on books Aug. 1 this year will average fully 20 per cent above last year's record. This includes iron to be shipped in the remainder of the present year and in the first half of 1918. Little if any iron has been bought for shipment in the last half of next year. With order books so comfortably filled, sellers are inclined to hold back and allow consumers to take the initiative to cover for the balance of their first-half requirements. Last year a large tonnage of iron was booked for shipment in the first half of this year in the months of May and June. This year orders commenced to flow in early in April for that delivery. The second buying movement in 1916 commenced early in September and it is generally expected that no activity of note will be recorded this year before that date. Sales now are confined principally to spot iron that in some cases brings the full schedule and in others small reductions have been made on consignment orders that had to be disposed of quickly. On the other hand, where a particular brand of iron was wanted a slight premium was obtained. Practically all transactions now cover resale and not furnace iron. Conditions in the Hanging Rock district are unchanged with \$55, Iron-ton, representing the furnace price on No. 2 foundry, malleable and basic. It is rumored that production in both the North and the South has been cut off on account of the growing acute shortage of furnace coke. A few furnaces in both districts will blow out at an earlier date than expected for repairs on account of the coke situation. Based on freight rates of \$2.90 from Birmingham and \$1.26 from

Ironton, we quote, f.o.b. Cincinnati, for 1917 shipment, as follows:

Southern coke, No. 1 f'dry and 1 soft.	\$51.40 to \$52.40
Southern coke, No. 2 f'dry and 2 soft.	49.90 to 50.90
Southern coke, No. 3 foundry.	49.40 to 50.40
Southern coke, No. 4 foundry.	48.90 to 49.90
Southern gray forge	48.90 to 49.90
Ohio silvery, 8 per cent silicon.	87.26 to 91.26
Southern Ohio coke, No. 1.	56.26 to 57.26
Southern Ohio coke, No. 2.	56.26 to 57.26
Southern Ohio coke, No. 3.	55.26 to 56.26
Southern Ohio malleable Bessemer.	56.26 to 57.26
Basic, Northern	56.26 to 57.26
Lake Superior charcoal	56.75 to 57.75
Southern carwheel foundry	48.90 to 49.90

(By Mail)

Finished Material.—Warehouses are now able to make very good deliveries on most everything ordered with the exception of some sizes of structural shapes and sheets. The mills are evidently making progress on shipments. The demand for nearly all finished products, however, has been curtailed lately, due in a measure to the proposed Government regulation of prices, and also to the extreme hot weather that has been prevalent over the Central West in the past week. The nearby rolling mills are not soliciting any new business on either black or galvanized sheets and are only taking care of their old customers, in which endeavor they have been fairly successful. We quote No. 28 galvanized sheets around 8.65c., Cincinnati or Newport, Ky., and No. 28 galvanized at 10.65c.; iron and steel bars from jobbers' stocks are unchanged at 5c., and twisted steel bars 5.05c.; structural shapes, 5.25c., and plates $\frac{1}{4}$ in. and heavier 9.50c. The discount on machine bolts $\frac{3}{8}$ x 4 in. and smaller is now 40 per cent; larger and longer, 30 per cent. Cold rolled shafting is quoted at 15 per cent plus list. The mill supply business is still slow.

Coke.—Nothing of interest has developed with the exception of reports that the output in all fields had been very much curtailed within the past 10 days. It is extremely difficult to get sufficient labor in hot weather to keep the ovens in operation, and as a consequence there has been some inconvenience experienced both by furnace and foundry coke consumers. Prices for spot coke have climbed back to the previous high record, and some foundry coke has brought \$16, Connellsville, for prompt shipment. Contract figures range from \$12 to \$13 per net ton at oven. There are no stable prices for contract furnace coke, but desirable business would probably be accepted between \$9 and \$10 at oven. The same conditions exist in the Wise County, Pocahontas and New River fields.

Old Material.—Heavy melting steel scrap has been reduced to \$32 per gross ton and other reductions have been made that average about \$1 a ton. No. 1 railroad wrought is quoted to-day at \$31.50 per net ton, and is weak at that figure. Cast borings and steel turnings are also weak, but only a slight reduction was made in regular quotations on these two grades. Offerings are heavier and outbound shipments are slower. The following are dealers' prices, f.o.b. at yards, southern Ohio and Cincinnati:

Per Gross Ton	
Bundled sheet scrap	\$19.50 to \$20.00
Old iron rails	33.00 to 33.50
Relaying rails, 50 lb. and up.	45.00 to 45.50
Rerolling steel rails	36.00 to 36.50
Heavy melting steel scrap.	32.00 to 32.50
Steel rails for melting.	32.00 to 32.50
Old carwheels	29.00 to 29.50

Per Net Ton	
No 1 railroad wrought	\$31.50 to \$32.00
Cast borings	12.50 to 13.00
Steel turnings	12.50 to 13.00
Railroad cast	23.00 to 23.50
No. 1 machinery cast	24.00 to 24.50
Burnt scrap	14.50 to 15.00
Iron axles	43.00 to 43.50
Locomotive tires (smooth inside)	36.00 to 36.50
Pipes and flues	17.50 to 18.00
Malleable cast	24.50 to 25.00
Railroad tank and sheet	15.50 to 16.00

Birmingham

BIRMINGHAM, ALA., Aug. 7 (By Wire).

Consumers show no disposition to purchase until Washington uncertainty is over with. There is practically no iron for 1917 delivery. Makers offer no concessions. Fifty dollars for 1917 and \$48 for 1918 is the

uniform quotation, with prompt metal at \$50 and higher.

BIRMINGHAM, ALA., Aug. 4 (By Mail).

Pig Iron.—Buying is almost nil, but there have been no price recessions. Operators quote a uniform level of \$50 for 1917 and one of \$48 for 1918. A regular customer of a large interest was quoted \$50 on iron deliverable in November and December. A prominent broker paid \$50 for a carlot to the furnace company, adding his commissions on this prompt shipment order. No orders for prompt shipment under \$50 have been noted; frequently more is charged. Most of the metal left over at ports belongs to Great Britain, and is not available for the market. To reach consuming territory, loading charges and freight rates back to Birmingham must be added. These conditions keep that business confined in a small area and to small movements. Furnace operators pay no attention to resale metal, as it does not affect their well-filled order books. One large concern is behind 30,000 tons in deliveries. Movements attained a high record for June, the Alabama Demurrage Association reporting 92,000 freight cars handled compared with 75,000 in June of 1916. The Trussville stack is expected to blow in by Sept. 1. With this the Vanderbilt furnaces of the Woodward and the Shelby stack active, Alabama production will attain new high levels. We quote per gross ton for prompt delivery, f.o.b. Birmingham district furnaces, as follows:

No. 1 foundry and soft.	\$50.50 to \$51.50
No. 2 foundry and soft.	50.00 to 51.00
No. 3 foundry.	49.50 to 50.50
No. 4 foundry.	49.25 to 50.25
Gray forge	49.00 to 50.00
Basic	50.00 to 51.00
Charcoal	55.00 to 56.00

Cast-Iron Pipe.—Pipe shops have another month's work on cantonment pipe. Municipalities are ordering scattering lots for fill-in purposes. Prices are unchanged. We quote per net ton, f.o.b. yards, as follows: 4 in., \$63; 6-in. and upward, \$60.

Coal and Coke.—Coal operators are exerting every effort for a maximum production in expectancy of the threatened walkout of the newly organized miners fixed for Aug. 20, unless the operators meanwhile come to terms, which the operators flatly decline. Coke has softened \$1 to \$2 per ton in sympathy with reductions in Virginia and other sections. Spot is now quoted at \$12.50 per net ton, but very little is to be had, most makers being behind on deliveries.

Old Material.—Scrap is still weaker. Quotations are not changed for the week, but the consumers have the situation in control and frequently make terms below the market prices. We quote per gross ton, f.o.b. dealers' yards, as follows:

Old steel axles.	\$50.00 to \$51.00
Old steel rails.	25.00 to 26.00
No. 1 wrought.	28.00 to 29.00
No. 1 heavy melting steel.	18.00 to 19.00
No. 1 machinery cast.	22.50 to 23.00
Carwheels	25.00 to 25.50
Tram carwheels	23.00 to 23.50
Stove plate and light.	16.00 to 17.00
Turnings	11.00 to 12.00

Bars.—Steel bars in car lots, f.o.b. Birmingham, are quoted at 4.75c. to 5c.; iron bars, 4.30c. to 4.50c.

The plant of the Southern Manganese Co. at Anniston, allied with the Anniston Ordnance Works and the electrical steel furnaces at Anniston, has been completed and one furnace is in operation.

San Francisco

SAN FRANCISCO, Aug. 2.

Uncertainty as to the Government's program of requisitioning products of the steel mills has not tended towards instilling confidence in the minds of those engaged in the steel industry or in large operations dependent on steel products. The suspense has caused cessation of many activities, the majority of which, perhaps, are of comparatively minor importance, yet in the aggregate forms a considerable obstacle to satisfactory business progress. About July 10 there was an incipient

strike at the Alameda plant of the Union Iron Works. Nearly 1000 riveters and other skilled workmen walked out, the riveters demanding substantial raises in their wage scale. There was only a temporary dislocation of operations at the plant, and the men returned to their posts in a few days. The presence of half a company of soldiers, always on guard at the works, no doubt had a salutary effect on the situation. Newspaper accounts of a large steel plant about to be established on the Coast, with the investment of \$20,000,000, have excited no little interest among steel men, but the project appears to be indefinite, as yet, and premature in announcement.

Bars.—There is still a lively demand for steel bars with insufficient means of satisfying it. Twisted steel bars are being called for eagerly by builders and local dealers are kept busy in supplying their needs. Local mills quote steel bars unchanged at a base range of 4.25c. to 4.75c. in carload lots. Jobbers offer twisted steel bars at a base price of 6c.; steel bars at 6c., or 5.50c. in carload lots.

Structural Materials.—A fair amount of public work in the interior of the State has been in progress for some time, but the buildings are nearing completion. Pending the Government's decision as to the exact amount of steel that will be held from the market, dealers and customers alike are in a quandary. New plans are being reconsidered and projects laid aside until the situation clears. Most of the construction going on in San Francisco, both public and private, is nearly finished and the continued high prices of material, with no signs of relief, have driven the capitalists out of the building field. Quotations from local mills vary from 5c. to 5.85c., being considerably under jobbers' figures, in smaller than carload lots.

Plates.—Every effort is being made by Eastern mills to keep the shipyards of the Coast supplied with sufficient ship plates, but the task is a difficult one and is made more complex by the entry of new shipbuilding aggregations into the field. Besides the great building program of the Union Iron Works, other concerns have secured heavy contracts, as, for instance, the newly organized Moore shipyard, which is under contract for the building of 10 large steamers. These new demands complicate the already congested demands for more material. Jobbers and representatives of Eastern mills continue to quote base prices of 12c. for ship plates and 10c. for tank plates, but there is no assurance of any early delivery, or of a firm quotation except on day of shipment.

Sheets.—Military needs and other Government requirements have considerably shortened the visible supply of sheets, as well as that of other material. The new prices announced by jobbers three weeks ago have not been changed on blue and galvanized sheets, which are quoted at, for No. 10 blue annealed sheets, 10.50c., and for galvanized sheets, 12.74c.

Wrought Pipe.—The lack of supply of wrought pipe continues to be a serious problem to solve. Requirements of the oil fields are insistent, with only a limited amount of exploitation work in progress. Jobbers' quotations have not advanced and 2-in. black pipe is quoted at \$27.65 per 100 ft.; 2-in. galvanized pipe, \$35.40.

Cast-Iron Pipe.—Few public works demanding the use of cast-iron pipe are now in contemplation. Orders, even of small caliber, are infrequent. A contract has been awarded in Los Angeles for 600 tons of 6-in. and 8-in. pipe, at prices of \$71.60 to \$74.60.

Pig Iron.—There is no Chinese pig iron in this market to-day, nor has there been any for some time. The high freight rates, averaging \$40 a ton from the Orient, prevent shipments, and the only supplies arriving are in fulfillment of old contracts, very few in number. No. 1 foundry, f.o.b. Birmingham, is quoted here at \$50, but with no guarantees of delivery.

Coke.—Good Eastern coke is extremely scarce in this market and is quoted at figures of \$20 to \$23, with no specified delivery. Contracts can hardly be made for coke in needed amounts. Some dealers offer spot coke at \$27.50 from stocks in hand which had been supplied from old contracts made at cheaper prices.

Old Materials.—Stocks of both heavy and light scrap have been very scarce and high for some time past. As high as \$40 a ton has been paid for small lots of heavy melting. Dealers are procuring supplies from the valleys of the interior, farm scrap being shipped down the Sacramento River by water carriage. Last week, 450 tons of heavy scrap were shipped here from Mexican ports, part of which was mining machinery from abandoned mines and part the results of the wreckage of war. Stories of vast piles of old material lying ready for shipment at various assembling points in Mexico, supplemented by the arrival of a shipment, have caused the market here to ease off, and quotations have dropped under \$35 for No. 1 machinery scrap with light scrap at \$22 to \$24. These prices may be augmented if the exportation of scrap to Japan is continued under Government license.

British Steel Market

Pig Iron Active and Strong—Tin-Plate Demand Exceeds Supply

(By Cable)

LONDON, ENGLAND, Aug. 8.

The pig-iron market is active and the general demand remains strong. Tin plates are firm with demand exceeding supply and prices unrestricted only for stock free from permits until Aug. 31. American wire rods have been sold for the last quarter at £28 and a lot of Bessemer rods has just been shipped at £29, c.i.f. Liverpool. Ferromanganese is nominally strong.

Benzol is quoted at 13d. and toluol and ammonium sulphate are unchanged. We quote as follows:

Tin plates, coke 14 x 20; 112 sheets, 108 lb., f.o.b. Wales, maximum, 30s.
Black sheets, £21 5s.
Ferromanganese, £45 nominal.
Ferrosilicon, 50 per cent, c.i.f., £35 upward.
On other products control prices are as quoted in THE IRON AGE of July 19, p. 171.

Ferromanganese Market Very Tight—New Maximum Prices for Pig Iron

LONDON, ENGLAND, July 17, 1917.—The price control shows no sign of being relaxed. The rise in prices of uncontrolled products has been gradual and of no great importance except in tin plates and black sheets, while only few alterations have taken place in controlled prices. There was an advance of 5s. a ton in South Staffordshire part mine forge and foundry iron to £5 and £5 2s. 6d., respectively. A new order fixes the maximum price of Cleveland as well as South Staffordshire, Shropshire and Worcestershire basic iron at £4 17s. 6d. Maximum prices have also been fixed for special brands of hematite iron (malleable), such as refined cupola cast varying from £8 to £8 5s., and cast direct from blast furnaces varying from £6 17s. 6d. to £7 10s.

The third quarter so far has disclosed no alteration in general conditions, but government work continues predominant. Merchant business is negligible.

No Pig Iron to Neutrals

Pig iron is unchanged and underlying conditions are firm. No iron is now allowed to go to neutrals, and it is inferred that the business in American iron, which heretofore was handled through merchants under British permits, will cease, in view of the American embargo. A further advance in wages has been made to Cleveland blast furnacemen and miners based on the ascertained selling price of No. 3 pig iron for the last quarter at 94s. 4.91d. against 89s. 8.76d. for the first quarter. Deliveries to home consumers of hematite iron seem more satisfactory, although an extension of output is needed, as larger allocations may shortly have to be made subject to an official revision of prices. Foreign ore deliveries have improved but demand is intense.

Since Government needs absorb nearly all of the semi-finished steel output, other requirements remain unrelieved and shell discards are in keen demand. The possibility of securing American billets is as remote as

ever, although odd quantities of wire rods are still obtainable with some business passing at about £28, c.i.f. Liverpool, for the third quarter, but terms vary up to £30 for near at hand parcels. There are plenty of buyers, but very few sellers.

In finished steel war needs predominate. The mills are heavily booked ahead, while considerable arrears have yet to be made good against old orders. The speeding up of the shipbuilding program keeps plate makers going at full pressure and the demand exceeds the supply. Demand for bar iron is incessant, especially the higher grades, at full prices. Since the restrictions were enforced on finished steel prices, makers' costs have increased, but the representations made to secure a revision of maximum rates do not carry much weight with the authorities.

New Steel Plant and Shipyard

An important engineers' scheme is contemplated on the Teeside that will involve an expenditure of £3,000,000. At a meeting of the Tees Conservancy Commissioners, the transfer was approved of 21 acres of land at Portrack abutting on the river to the East Coast Steel Corporation, which is a new company being formed to erect blast-furnaces, steel works and an extensive shipyard on the site. The scheme is to be taken in hand this year. A syndicate of northern ironmasters are the promoters of the undertaking.

Tin-plate prices have strengthened further. Makers are in some cases overbooked against their steel allocations. Demand is in excess of supply. Quotations vary from 35s. to 36s. per basis, f.o.b. against war work, and very few makers are quoting, while the drain on merchants' stocks proceeds unchecked, chiefly because of the big orders placed recently to cover urgent French requirements. Stockplates are very scarce, odd lots free from permit restrictions commanding a big premium, at fully 44s. basis.

Manganese Ore High and Scarce

The position in ferromanganese is as tight as it can be. Sellers are extremely rare and business has been done up to £80, f.o.b. for forward shipment to a continental port subject to permit being granted. The last transaction reported on North American account was at 400 c.i.f. for shipment in the third quarter. Makers are virtually out of the market and prices for export are nominal. Business in Indian manganese ores has been more difficult because of tonnage scarcity, and the price is nominally about 3s. 6d. per unit c.i.f. United Kingdom ports.

New York

NEW YORK, Aug. 8.

Pig Iron.—It is true of the market as it was true last week that while it is exceedingly quiet there is a little more inquiry than was seen in the greater part of July. A New Jersey open-hearth steel works is inquiring for 5000 tons of basic iron for the last quarter of this year. There is an inquiry for 800 tons of foundry iron from a New Jersey foundry for first quarter of 1918, and several inquiries are up for 400 and 500-ton lots. Buffalo iron figures very little in the Eastern market at present and transactions in eastern New York and New England in recent weeks have been in part due to backlog sales for the furnace that is soon to start at Troy, N. Y. An inquiry for foundry in the New York district for 500 to 1000 tons for 1918 delivery has apparently become inactive. The company had presumably covered for most of the first half of next year and this inquiry was in view of additional work it was taking. Export iron is coming on the market in a few cases. For the most part prices show no change. We quote for tidewater delivery in the near future as follows:

No. 1 foundry	\$53.25 to \$54.25
No. 2 X	52.75 to 53.75
No. 2 plain	52.50 to 53.50
Southern No. 1 foundry	52.75 to 53.75
Southern No. 2 foundry and soft	52.25 to 53.25

Ferroalloys.—The ferromanganese market is quiet and steady, with quotations practically unchanged from those prevailing for the last month. Domestic ferro-

manganese can be obtained at \$400 for early delivery, at \$375 for the last quarter and at \$350 for the first half of next year. A little more interest is being taken in the market, but the only sales reported are those of small lots for nearly all deliveries. British ferromanganese is practically unobtainable for any position, even into next year. With receipts from Great Britain at a low mark in July and with the prospect of their being at a still lower mark in August, the general situation is viewed with some anxiety in some quarters. The only reassuring fact on the horizon is the increasing output of the domestic alloy, the blast furnace reports of THE IRON AGE for July indicating a production of not less than 23,500 gross tons, which is a record for any month in the history of the industry. It is a fact, however, that a large part of this production is for companies which consume the greater part of the output themselves. The spiegeleisen market is active, inquiries for over 5000 tons having appeared, including those mentioned last week, but no sales have yet been reported. The quotation is still \$85, furnace. Imports of Indian manganese ore are reported as fairly liberal recently, and as high as \$1.15 per unit has been paid for manganese ore from that and other sources, such as Cuba. Ferrosilicon, 50 per cent, is unchanged at about \$200 per ton for delivery this year, with \$130 asked for delivery in 1918.

Structural Material.—An indication of the present state of the building trade in New York is afforded by the statement of one of the largest interests furnishing such material for office buildings, apartments and lofts that the month of July was the worst in the history of the company. The same situation prevails in nearly all other branches of this market and even Government orders, which had been the mainstay for some time, have nearly disappeared, at least temporarily. An interesting statement is to the effect that the armor plate plant for the Government involving 25,000 tons has been revived, at least politically. The two largest contracts which have recently been reported are 1000 tons for a new pump station for the Worthington Pump & Machinery Corporation, Harrison, N. J., taken by the National Bridge Co., and 1200 tons for the extension to the Park Avenue viaduct, by Terry & Tench. Other contracts recently awarded are the following: American Bridge Co. has taken 300 tons for an addition to the Stanley Works at New Britain, Conn.; the Hedden Iron Works, 250 tons for a boiler shop for the Staten Island Shipbuilding Co.; the McClintic Marshall Co., 160 tons for two bridges for the Philadelphia & Reading; the Boston Bridge Works, 100 tons for two bridges for the Baltimore & Ohio and the American Bridge Co., 100 tons for a bridge for the Philadelphia & Reading. The Central Railroad of New Jersey has awarded 200 tons for a coal pier and the Pennsylvania Railroad is inquiring for 200 tons for two or three bridges and the New York, New Haven & Hartford for 100 tons for a bridge at South Boston. For an extension to its plant at Trenton, N. J., the American Steel & Wire Co. has placed 300 tons with the American Bridge Co. The Chesapeake & Ohio is asking for about 200 tons for several bridges and the Interborough Rapid Transit Co. for 500 tons for additions to car sheds in New York. We quote plain material from mill at 4.669 to 5.169c., New York, the lower price in three to four months and the higher for small lots in earlier deliveries. Shipments from warehouses are 5c. to 5.25c. per pound, New York, according to sizes desired.

Plates.—The past week has been uneventful. There remains some demand for export, but domestic business, except for scattered lots of small tonnages for urgent requirements, is exceedingly quiet. The mills relish the opportunity for a breathing spell to catch up to some extent on their orders. Considerable confusion has been caused since the promulgation of the President's new embargo on export shipments by the scramble of exporters to obtain earlier rolling of their plate orders than had been specified. Exporters who had not been promised delivery until some time this fall have been appealing to the mills to give their orders preference before Aug. 10, in order that they might ship before the ruling becomes effective that

nothing but plates for actual war needs shall leave the country. There have been no new developments regarding the shipment of plates and shapes to Japanese shipbuilding concerns, and none is expected until the arrival of the special Japanese commission, now on its way to Washington. It is expected that the full tonnage contracted for will go forward as per schedule as soon as the matter is threshed out. This confidence in the outcome of the situation seems to extend to the Japanese interests, also, for an order was placed Aug. 7 at 10.75c. for less than 100 tons of tank plates, and it is claimed that large amounts would be closed if mills were willing to take on the business. We learn of a mill asking 12c. for fabricating plates for fairly prompt shipment. We quote without change tank plates for mill shipment at 10.169c., New York, and ship plates at 12.169c., New York. Plates out of store are 8c. to 9c. for tank quality and 8.50c. to 9.50c. for ship plates.

Iron and Steel Bars.—New inquiry is infrequent, buyers generally awaiting the outcome of present Government consideration of material prices, while the mills find issues so clouded as to leave doubt about what they really have to sell. The one activity is a continued inflow of specifications on contracts. In the absence of sales of importance, we continue to quote steel bars in mill shipments at 4.669c. to 5.669c., New York. Good buying marks the iron bar market, with most of the business at 5c., Pittsburgh basis, though large lots, one, for example, of 500 tons, go at as low as 4½c. per pound. We quote mill shipments of bar iron at 4.919c. to 5.169c., New York. From New York district warehouses steel and iron bars are sold at 5c. to 5.50c.

Cast-Iron Pipe.—For the two lots of pipe work for the Department of Water Supply, Gas and Electricity, New York, R. D. Wood & Co. will supply the 1227 tons involved. No other public lettings are noted, but there is more private buying. Carloads of 6-in., 8-in. and heavier are quoted at \$65.50 per net ton, tidewater, and 4-in. at \$68.50.

Old Material.—What little business has been done shows strength in prices rather than weakness. Dealers express a belief in a decided betterment almost any time and emphasize that no further weakness, even considering the embargoes against consumers' yards, need be considered in view of the immeasurable demands on the steel mills. Brokers quote buying prices as follows to local producers and dealers per gross ton, New York:

Heavy melting steel scrap (for shipment to eastern Pennsylvania).....	\$29.50 to \$30.50
Old steel rails (short lengths) or equivalent heavy steel scrap.....	29.50 to 30.50
Relaying rails.....	65.00 to 70.00
Re-rolling rails.....	39.00 to 40.00
Iron and steel car axles.....	42.00 to 43.00
No. 1 railroad wrought.....	41.00 to 42.00
Wrought-iron track scrap.....	32.00 to 33.00
No. 1 yard wrought long.....	32.00 to 33.00
Light iron.....	10.00 to 12.00
Cast borings (clean).....	21.00 to 21.50
Machine-shop turnings.....	18.00 to 19.00
Mixed borings and turnings.....	16.50 to 17.00
Wrought-iron pipe (1 in. minimum diameter, not under 2 ft. long)....	30.00 to 31.00

For cast-iron scrap dealers in New York City and Brooklyn are quoting as follows to local foundries per gross ton:

No. 1 machinery cast.....	\$34.00 to \$35.00
No. 1 heavy cast (column, building material, etc.).....	29.00 to 30.00
No. 2 cast (radiators, cast boilers, etc.).....	28.00 to 29.00
Stove plate.....	20.00 to 21.00
Locomotive grate bars.....	20.00 to 21.00
Old carwheels.....	33.00 to 34.00
Malleable cast (railroad).....	32.00 to 33.00

St. Louis

ST. LOUIS, Aug. 6.

Pig Iron.—While the selling of small lots of pig iron at high prices continues, chiefly because of immediate urgent needs, no transactions of individual moment are appearing because of the general uncertainty which hangs over the market, particularly as to future prices and also supplies. In fact, quick shipment business at fancy prices dominates the situation, and naturally the quantities handled are not large.

On No. 2 Southern, \$50 Birmingham is being paid, but prices run down to \$48, these two figures constituting the range. No. 2 X, Chicago, is commanding \$55 per ton, and No. 2 Northern \$55 per ton, Iron-ton, while Lake Superior charcoal iron is selling as high as \$60 per ton. All interests seem to be awaiting a settlement of the general situation, both buyers and sellers, and the former seem for the most part to have enough iron contracted for or in the yards to make them feel measurably safe.

Coke.—Small lots of coke are selling for spot or near future delivery, but there is no deferred contract business in the market. Spot coke is selling at \$13 Connellsville in small lots for best selected 72-hr. foundry grades, while furnace coke is held at \$11.50 to \$12.50. By-product coke is not figuring much in the market at the present time.

Finished Iron and Steel.—No new business is being accepted, and the chief interest in finished products seems to be in getting deliveries on material already contracted for, the pressure being particularly strong and becoming more accentuated. Movement out of warehouse is maintained up to the ability to deliver. For stock out of warehouse, we quote as follows: Soft steel bars, 4.55c.; iron bars, 4.50c.; structural material, 5.05c.; tank plates, 8.05c.; No. 10 blue annealed sheets, 10.05c.; No. 28 black, cold rolled, one pass, 10.35c.; No. 28 galvanized, black sheet gage, 11.75c.

Old Material.—The scrap market, because of the lack of business, shows a weaker tendency, though it is not quotably lower, there having been no transactions on which to base a revision of prices. There is no demand at present from the steel mills, rolling mills or foundries, and practically all the little business being done is on material to ship East. About the only sign of life shown in the market to-day was in borings, and not much in that. Lists out include one for 1500 tons from the Union Pacific, and one for 1250 tons from the Big Four. None of the roads with St. Louis headquarters has put out any material so far this month, and little is expected. We quote dealers' prices f.o.b. St. Louis industrial district, at customers' works, as follows:

Per Gross Ton	
Old iron rails.....	\$38.00 to \$38.50
Old steel rails, re-rolling.....	40.00 to 40.50
Old steel rails, less than 3 ft.....	39.00 to 40.00
Relaying rails, standard section, subject to inspection.....	50.00 to 51.00
Old carwheels.....	30.50 to 31.00
No. 1 railroad heavy melting steel scrap.....	31.00 to 31.50
Heavy shoveling steel.....	27.00 to 27.50
Ordinary shoveling steel.....	26.00 to 26.50
Frogs, switches and guards, cut apart.....	32.00 to 32.50
Ordinary bundled sheet scrap.....	18.50 to 19.00
Heavy axle and tire turnings.....	22.00 to 22.50

Per Net Ton	
Iron angle bars.....	\$35.00 to \$35.50
Steel angle bars.....	30.00 to 30.50
Iron car axles.....	41.00 to 41.50
Steel car axles.....	40.00 to 40.50
Wrought arch bars and transoms.....	39.00 to 39.50
No. 1 railroad wrought.....	33.00 to 33.50
No. 2 railroad wrought.....	31.00 to 31.50
Railroad springs.....	30.00 to 30.50
Steel couplers and knuckles.....	38.00 to 39.00
Locomotive tires, smooth inside, 42 in. and over.....	38.00 to 39.00
No. 1 dealers forge.....	24.00 to 24.50
Cast iron borings.....	14.50 to 15.00
No. 1 busheling.....	22.00 to 22.50
No. 1 boilers cut to sheets and rings.....	20.50 to 21.00
No. 1 railroad cast scrap.....	20.50 to 21.00
Stove plate and light cast scrap.....	16.50 to 17.00
Railroad malleable.....	27.00 to 27.50
Agricultural malleable.....	22.00 to 22.50
Pipes and flues.....	19.50 to 20.00
Heavy railroad sheet and tank scrap.....	18.00 to 18.50
Railroad grate bars.....	17.50 to 18.00
Machine shop turnings.....	14.50 to 15.00
Country mixed scrap.....	14.00 to 15.00

Sale of Kewanee Works Completed

On Aug. 1 the Kewanee plant of the National Tube Co. at Kewanee, Ill., was sold to the Walworth Mfg. Co., Boston, and on that date the National Tube Co. retired from the manufacture of pipe fittings. Mention was made in THE IRON AGE of July 12 of the negotiations for this sale, and in that connection it was stated that the product of the Kewanee plant, chiefly pipe fittings and valves, the output being 28,000 tons of gray iron and malleable castings per year and 2600 tons of brass castings, has complemented to a considerable extent that of the Walworth Mfg. Co.

IRON AND INDUSTRIAL STOCKS

Market Inactive and Professional, with No Definite Price Changes or Trends

Mid-summer dullness and inactivity has dominated in the stock market in the past week. Added to this, has been the period of excessive heat which interfered decidedly with speculative operations and was finally so potent that the governors of the exchange closed the market on Saturday of last week. The market as a whole has had very little trend one way or the other and has been entirely in the hands of professional traders, the total transactions any one day amounting to not more than 300,000 to 400,000 shares. Price changes have been very small in most cases. The steel stocks have been fairly strong with the general trend upward rather than downward, excepting the Bethlehem Steel stocks, which have receded on expectations of new financing.

The range of prices on active iron and steel stocks from Wednesday of last week to Tuesday of this week was as follows:

Allis-Chal., com., 29 1/4 - 31 3/4	Int. Har. of N. J., com., 112 3/4 - 113 1/2
Allis-Chal., pref., 83 3/4 - 86 1/4	Lacka. Steel, 92 3/4 - 94
Am. Can. com., 48 1/4 - 49 1/4	Lake Sup. Corp., 17 - 17 1/2
Am. Can. pref., 108 - 108 3/4	Midvale Steel, 58 5/8 - 59 3/4
Am. Car & Fdry., com., 76 - 77 1/2	Nat.-Acme, 34 3/8 - 35
Am. Car & Fdry., pref., 115 1/4 - 115 3/4	Nat. En. & Stm., com., 43 3/4 - 44 3/4
Am. Loco., com., 72 3/4 - 73 3/4	Nat. En. & Stm., pref., 99
Am. Loco., pref., 103 - 103 3/4	Nova Scotia Steel, 98 - 104 1/2
Am. Rad., pref., 291 3/4	Pitts. Steel, pref., 100
Am. Ship, com., 91 - 92	Pressed Stl., com., 73 - 74
Am. Steel Fdries, 68 - 70 3/4	Pressed Stl., pref., 102
Bald. Loco., com., 73 1/4 - 75 3/4	Ry. Steel Spring, com., 52 1/2 - 53
Beth. Steel, com., 127 1/2	Republic, com., 91 1/4 - 93 1/4
class B, 123 3/4 - 128 1/2	Republic, pref., 103 1/2 - 104
Cambria Steel, 155	Sloss, com., 54 - 56
Central Fdry., pref., 52 - 53	Superior Steel, 46 - 48
Colo. Fuel, 50 1/4 - 51 3/4	Transue-Williams, 42 - 43
Cruc. Steel, com., 81 1/4 - 85 3/4	Un. Alloy Steel, 44 1/4 - 44 1/2
Cruc. Steel, pref., 102 - 103	U. S. Pipe, com., 21 1/4 - 22
Deere & Co., pref., 100 1/2	U. S. Pipe, pref., 55 - 55 1/2
Gen. Electric, 154 1/4 - 155 1/2	U. S. Steel, com., 123 3/4 - 127 3/4
Gt. No. Ore. Cert., 33 3/4 - 35 1/2	U. S. Steel, pref., 117 1/2 - 119 3/4
Gulf States Stl., 117 - 119	Va. I. C. & Coke, 69 1/2 - 71
	Westing. Elec., 48 3/4 - 49 3/4

Dividends

American Brass Co., extra, 11 per cent; and quarterly, 1 1/2 per cent, both payable Aug. 15.

Eastern Steel Co., 2 1/2 per cent on the common and an extra, 5 per cent on the common, both payable Sept. 1; quarterly 1 3/4 per cent on preferred, payable Sept. 15.

Harbison-Walker Refractories Co., extra, 6 per cent on common, payable Aug. 15; quarterly, 1 1/2 per cent on common, payable Sept. 1; quarterly, 1 1/2 per cent on preferred, payable Oct. 20.

American Steel Foundries Report

Net earnings of the American Steel Foundries in the six months ended June 30 last were three and a half times greater than those in the same period of 1916. The report just issued shows net earnings of \$3,948,187, compared with \$1,314,226. Surplus after charges amounted to \$3,684,780, against \$1,022,815 last year. These earnings are at the rate of \$4.45 a share for the six months period, against \$6 a share earned in the same period of 1916.

Announcement was made by the company last Thursday that the directors had voted to retire the \$1,300,000 first mortgage 6 per cent bonds on the next interest date, Oct. 1. The company has already paid off its note issue of \$1,200,000, making the only outstanding obligation an issue of \$2,000,000 4 per cent debentures.

Earnings in the first half of 1914 amounted to only \$242,162. The company is booked to capacity well into 1918. It has a cash surplus of \$1,750,000 and a working capital of about \$11,000,000.

Midvale Steel Earnings

After setting aside \$4,619,524 as reserve for Federal taxes, the surplus earned for the capital stock of the Midvale Steel & Ordnance Co. in the quarter ended June 30 was \$12,224,302, equivalent to \$6.11 a share on the 2,000,000 shares outstanding. This was at the rate of \$24.44 a year.

Net earnings for the quarter were \$18,966,135, compared with \$15,859,738 in the preceding period. The

appropriation for Federal taxes was \$2,982,769 larger than the amount deducted for that purpose in the initial quarter of the current year. There was charged off to depreciation \$1,305,788, compared with \$1,381,840 in the preceding three months.

Receivers Appointed

John F. Anderson and C. H. Hafford of Butler, and Grover Higgins of Clearfield, have been appointed temporary receivers for the Pittsburgh-Hickson Co., Butler, Pa., following the filing of a petition by creditors of the company and holders of preferred stock. Permanent receivers will be appointed Aug. 18. The Pittsburgh-Hickson Co. engaged in the manufacture of brass and metal beds in East Butler, is capitalized at \$1,500,000 and employs about 300 persons. The temporary receivers are empowered to operate the plant.

Industrial Finances

The plant of the Carbon Iron & Steel Co., Parryville, Pa., has been sold to Albert Broden, representing the Central Railroad of New Jersey, for \$200,000. The railroad held a mortgage of \$350,000. The furnace will continue to operate as heretofore. It has an annual production of about 40,000 tons of pig iron.

A financial statement issued by the Savage Arms Corporation shows earnings for the quarter ended June 30, 1917, of \$462,105 and for six months ended that date of \$2,493,963. The stockholders were prepared for the statement showing a decline in earnings, because President Borie some time ago explained the necessity of adjusting the machinery of the Utica plant, where the Lewis machine guns are made, to make American caliber guns instead of the British type which the plant had been manufacturing. The corporation has closed orders for the United States Army, Navy, Marine Corps and Aviation Corps for between 20,000 and 25,000 machine guns involving more than \$30,000,000.

The National Acme Co., Cleveland, manufacturer of automatic screw machines, earned \$2,510,000 net in the six months ended June 30, last. This is equal to \$5 a share on the 500,000 shares of stock, par value \$50, and an annual rate of \$10 a share or 20 per cent.

Reviewing the position of the Canadian Car & Foundry Co. at the annual meeting, at Montreal, Senator Curry, the president, said that orders on the books of the company now amounted to over \$35,000,000. The execution of this business, much of it in regular lines of manufacture, he said, required so much floating capital that payments on the preferred stock would be held in abeyance until the assets of the company are in a more liquid position.

Pittsburgh and Nearby Districts

It is probable that a very large number of foundrymen from the Pittsburgh district will attend the annual meeting of the American Foundrymen's Association, to be held in Boston, Sept. 24-29. Arrangements for the trip from Pittsburgh are in the hands of F. H. Zimmers, secretary of the Pittsburgh Foundrymen's Association, and he reports that already a large number of Pittsburgh foundrymen have notified him they intend to go to the convention.

On Aug. 1 the Carnegie Steel Co., Pittsburgh, had 48 blast furnaces in operation and 11 were idle. Of these five stacks are banked for lack of coke, these being 2 Edgar Thomson, 1 Mingo Junction and two Ohio stacks. The other idle stacks are Steubenville, 1 Belaire, Zanesville, 1 Edgar Thomson, 1 Clairton and Edith. Neville Island stack in Pittsburgh, which was idle for many months, blew in on July 14.

The first steel at the Valley Mold & Iron Co. was poured July 26 at its new ingot mold foundry at West Middlesex. Work of building the plant was started four months ago, and it was completed in record time.

The contract for coal that has existed for some years between the Pittsburgh Coal Co. and the United States Steel Corporation is being readjusted. This is being done on account of the very high advance in the price of coal, which made the contract, as at first executed, unprofitable to the Pittsburgh Coal Co.

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Freight rates from Pittsburgh in carloads, per 100 lb.: New York, 16.9c.; Philadelphia, 15.9c.; Boston, 18.9c.; Buffalo, 11.6c.; Cleveland, 10.5c.; Cincinnati, 15.8c.; Indianapolis, 17.9c.; Chicago, 18.9c.; St. Louis, 23.6c.; Kansas City, 43.6c.; Omaha, 43.6c.; St. Paul, 32.9c.; Denver, 68.6c.; New Orleans, 30.7c.; Birmingham, Ala., 45c.; Denver pipe, 76.1c., minimum carload, 46,000 lb.; structural steel and steel bars, 76.1c., minimum carload, 40,000 lb.; Pacific coast (by rail only), pipe, 65c.; structural steel and steel bars, 75c., minimum carload, 60,000 lb. No freight rates are being published via the Panama Canal, as the boats are being used in transatlantic trade.

Structural Material

I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in. on one or both legs, 1/4 in. thick and over, and zees 3 in. and over, 4.50c.

Wire Products

Wire nails, \$4 base per keg; galvanized, 1 in. and longer, including large-head barb roofing nails, taking an advance over this price of \$2, and shorter than 1 in., \$2.50. Bright basic wire, \$4.05 per 100 lb.; annealed fence wire, Nos. 6 to 9, \$3.95; galvanized wire, \$4.65; galvanized barb wire and fence staples, \$4.85; painted barb wire, \$4.15; polished fence staples, \$4.15; cement-coated nails, \$3.90 base, these prices being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to point of delivery, terms 60 days net, less 2 per cent off for cash in 10 days. Discounts on woven-wire fencing are 43 per cent off list for carload lots, 42 per cent off for 1000-rod lots, and 41 per cent off for small lots, f.o.b. Pittsburgh.

Nuts and Bolts

Discounts in effect for large buyers are as follows, delivered in lots of 300 lb. or more, when the actual freight rate does not exceed 20c. per 100 lb., terms 30 days net, or 1 per cent for cash in 10 days.

Carriage bolts, small, rolled thread, 40 per cent, small cut thread, 35 and 2 1/2 per cent; large, 25 per cent. Machine bolts, h. p. nuts, small, rolled thread, 40 and 10 per cent; small, cut thread, 40 per cent; large, 30 per cent. Machine bolts, c. p. c. and t. nuts, small, 30 per cent; large, 20 per cent. Bolt ends, h. p. nuts, 30 per cent; with c. p. nuts, 20 per cent. Lag screws (cone or gimlet point), 45 per cent.

Nuts, h. p. sq. blank, \$2.10 off list, and tapped, \$1.90 off; hex. blank, \$1.90 off, and tapped, \$1.70 off; nuts, c. p. c. and t. sq. blank, \$1.70 off, and tapped, \$1.50 off; hex. blank, \$1.60 off, and tapped, \$1.40 off. Semi-finished hex. nuts, 50 and 10 per cent. Finished and case-hardened nuts, 50 and 10 per cent.

Rivets 7/16 in. in diameter and smaller, 40 per cent.

Wire Rods

Soft Bessemer and open-hearth rods to domestic consumers at \$95 to \$100; high-carbon rods made from ordinary open-hearth steel, \$100 to \$110, and special steel rods with carbons running from 0.40 to 0.60, \$100 to \$110 at mill; above 0.60 carbon, \$115 to \$120.

Railroad Spikes and Track Bolts

Railroad spikes 9/16 in. and larger, \$7.00 base; 5/8 in., 7/16 in. and 1/2 in., \$7.00. Boat spikes are occasionally quoted \$7.00 to \$8.00, all per 100 lb. f.o.b. Pittsburgh, but some makers are quoting higher. Track bolts with square nuts, 7c. to 7.50c. to railroads, and 8c. to 8.50c., in small lots, for fairly prompt shipment.

Steel Rails

Angle bars at 3.50c. to 3.75c. at mill, when sold in connection with orders for standard section rails, and on carload and smaller lots, 4c. to 4.25c. at mill. Light rails: 25 to 45 lb., \$75 to \$80; 16 to 20 lb., \$80 to \$81; 12 and 14 lb., \$82 to \$83; 8 and 10 lb., \$83 to \$84; in carload lots, f.o.b. mill, with usual extras for less than carloads. Standard Bessemer rails, \$38; open-hearth, \$40, per gross ton, Pittsburgh.

Tin Plate

Effective July 31, prices on all sizes of terne plate were advanced from \$2 to \$2.50 per package. Prices quoted by leading makers are now as follows: 8-lb. coating, 200 lb., \$16 per package; 8-lb. coating, I. C., \$16.30; 12-lb. coating, I. C., \$17.50; 15-lb. coating, I. C., \$18.25; 20-lb. coating, I. C., \$19; 25-lb. coating, I. C., \$20; 30-lb. coating, I. C., \$21; 35-lb. coating, I. C., \$22; 40-lb. coating, I. C., \$23 per package, all f.o.b. Pittsburgh, freight added to point of delivery.

Iron and Steel Bars

Steel bars at 4.50c. to 5c. for delivery late this year, and 5c. and higher from warehouse, in small lots for prompt shipment. Refined iron bars, 4.75c.; railroad test bars, 5.25c. in carload and larger lots f.o.b. mill.

Wrought Pipe

The following discounts on steel are to jobbers for carload lots on the Pittsburgh basing card in effect from May 1, 1917, all full weight, except for LaBelle Iron Works and Wheeling Steel & Iron Co., which quote higher prices, and National Tube Co., which adheres to card of April 1,

Steel			Butt Weld		
Inches	Black	Galv.	Inches	Black	Galv.
1/4, 1/2 and 3/4	42	15 1/2	1/4 and 1/2	23	+4
1/2	46	31 1/2	1/2	24	+3
3/4 to 3	49	35 1/2	3/4	28	10
			1 to 1 1/2	33	17
Lap Weld			Lap Weld		
2	42	29 1/2	2	26	12
2 1/2 to 6	45	32 1/2	2 1/2 to 6	28	15
7 to 12	42	28 1/2	7 to 12	25	12
13 and 14	32 1/2	..			
15	30	..			
Butt Weld, extra strong, plain ends			Butt Weld, extra strong, plain ends		
1/4, 1/2 and 3/4	38	20 1/2	1/4, 1/2 and 3/4	22	5
1/2	43	30 1/2	1/2	27	14
3/4 to 1 1/2	47	34 1/2	3/4 to 1 1/2	33	18
2 to 3	48	35 1/2			
Lap Weld, extra strong, plain ends			Lap Weld, extra strong, plain ends		
2	40	28 1/2	2	27	14
2 1/2 to 4	43	31 1/2	2 1/2 to 4	29	17
4 to 6	42	30 1/2	4 1/2 to 6	28	16
7 to 8	38	24 1/2	7 to 8	20	8
9 to 12	33	19 1/2	9 to 12	15	3

To the large jobbing trade an additional 5 per cent is allowed over the above discounts, which are subject to the usual variation in weight of 5 per cent. Prices for less than carloads are four (4) points lower basing (higher price) than the above discounts on black and 5 1/2 points on galvanized.

On butt and lap weld sizes of black iron pipe, discounts for less than carload lots to jobbers are seven (7) points lower (higher price) than carload lots, and on butt and lap weld galvanized iron pipe are nine (9) points lower (higher price).

Boiler Tubes

Nominal discounts on less than carload lots, freight added to point of delivery, effective from Nov. 1, 1916, on standard charcoal iron tubes, and from April 2, 1917, on lap-welded steel tubes are as follows:

Lap-Welded Steel	Standard Charcoal Iron
1 1/4 and 2 in.....31	1 1/4 in.....23
2 1/4 in.....28	1 1/2 and 2 in.....25
2 1/2 and 3 in.....34	2 1/4 in.....32
3 and 3 1/4 in.....34	2 1/2 and 3 in.....38
3 1/2 to 4 1/2 in.....34	3 and 3 1/4 in.....43
5 and 6 in.....33	3 1/2 to 4 1/2 in—No quotations
7 to 13 in.....30	5 and 6 in.....37
	7 to 13 in.....34

Above discounts apply to standard gages and to even gages not more than four gages heavier than standard in standard lengths. Locomotive and steamship special charcoal grades bring higher prices.

1 1/4 in., over 18 ft., and not exceeding 22 ft., 10 per cent net extra.

2 in. and larger, over 22 ft., 10 per cent net extra.

Sheets

Makers' prices for mill shipments on sheets of United States standard gage, in carload and larger lots, are as follows, 30 days net, or 2 per cent discount in 10 days. [Open-hearth stock, \$5 per ton above these prices.]

Blue Annealed—Bessemer		Cents per lb.	
Nos. 3 to 8	.....	8.00 to	8.50
Nos. 9 and 10	.....	8.25 to	8.50
Nos. 11 and 12	.....	8.50 to	8.75
Nos. 13 and 14	.....	8.75 to	9.00
Nos. 15 and 16	.....	9.00 to	9.25
Box Annealed, One Pass Cold Rolled—Bessemer		Cents per lb.	
Nos. 17 to 21	.....	8.30 to	8.80
Nos. 22 and 24	.....	8.35 to	8.85
Nos. 25 and 26	.....	8.40 to	8.90
No. 27	.....	8.45 to	8.95
No. 28	.....	8.50 to	9.00
No. 29	.....	8.55 to	9.05
No. 30	.....	8.65 to	9.15
Galvanized Black Sheet Gage—Bessemer		Cents per lb.	
Nos. 10 and 11	.....	9.00 to	9.50
Nos. 12 and 14	.....	9.10 to	9.60
Nos. 15 and 16	.....	9.25 to	9.75
Nos. 17 to 21	.....	9.40 to	9.90
Nos. 22 and 24	.....	9.55 to	10.05
Nos. 25 and 26	.....	9.70 to	10.20
No. 27	.....	9.85 to	10.35
No. 28	.....	10.00 to	10.50
No. 29	.....	10.25 to	10.75
No. 30	.....	10.50 to	11.00
Tin-Mill Black Plate—Bessemer		Cents per lb.	
Nos. 15 and 16	.....	7.80 to	8.30
Nos. 17 to 21	.....	7.85 to	8.35
Nos. 22 to 24	.....	7.90 to	8.40
Nos. 25 to 27	.....	7.95 to	8.45
No. 28	.....	8.00 to	8.50
No. 29	.....	8.05 to	8.55
No. 30	.....	8.05 to	8.55
Nos. 30 1/2 and 31	.....	8.10 to	8.60

Metal Markets

The Week's Prices

Cents Per Pound for Early Delivery							
Copper, New York		Tin		Lead		Spelter	
Aug.	Lake	Electro-lytic	New York	New York	St. Louis	New York	St. Louis
1.....	29.00	29.00	63.87½	10.87½	10.75	8.75	8.50
2.....	29.00	29.00	63.87½	10.75	10.62½	8.75	8.50
3.....	29.00	29.00	63.62½	10.75	10.62½	8.75	8.50
4.....	29.00	29.00	.....	10.75	10.62½	8.75	8.50
6.....	28.50	28.50	63.75	10.87½	10.75	8.75	8.50
7.....	28.00	28.00	63.62½	10.87½	10.75	8.75	8.50

NEW YORK, Aug. 8.

The metals are nearly all nominal with business at a decidedly low ebb, still caused by uncertainties as to the Government's attitude. Copper is nominally lower but strong. Tin is dull and inactive. Lead is quiet but firm in an almost nominal market. Spelter is nominally unchanged with business almost at a standstill. Antimony is quiet and unchanged.

New York

Copper.—After a brief period last week of advancing prices the copper market has receded again to lower levels until yesterday the quotation for both Lake and electrolytic was 28c. per lb., New York. The market is peculiar in that fundamental conditions are strong despite continued dullness, which is the outstanding feature. No one appears anxious to buy under present conditions. The air is full of rumors regarding the price which both the Government and its Allies are to pay for copper, the latest speculation fixing it at 22c. to 23c. per lb., but no definite idea of the probable action of the Government is obtainable from any source and the result of the investigation as to the cost of copper production is not likely to be known for two or three weeks. Under these conditions, there is no reason for purchases except those absolutely necessary. Re-sale lots, the withdrawal of which was the cause of the upward trend in the market last week, were offered again on Aug. 3 at 29c., New York, but were not sold. Efforts to drum up business in most cases met with no response. One of the surprising incidents of the week has been the report that exports for June were only 28,198 tons as compared with an average of 38,512 tons per month for the previous five months. London quotations yesterday were unchanged at £137 for spot electrolytic and £133 for futures.

Tin.—It appears, from the revenue bill reported to the Senate on Monday, that there will be no duty on tin and the trade generally expects that this will be the case. At least one cause of uncertainty seems in a fair way to be removed by this action. The market as a whole for the entire week has been quiet and sales have been of small volume. On Aug. 3, about 100 tons of futures changed hands and earlier than that substantial quantities of off-grade brands were sold for prompt delivery but business in Straits tin was small. Early this week the market appeared quiet on the surface and was largely inactive although one seller reported the disposition of 100 tons of future which, outside of some activity in shipments from the East, was the only sale reported. The quotation yesterday for spot Straits was 63.62½c., New York. Arrivals of tin to Aug. 7 were 505 tons, but there has been no official report as to the quantity afloat so far this month, indicating the possibility that this data has been withheld from the public. In London yesterday, the quotation for spot Straits was £247, a decline of £1 from that of last week.

Lead.—Some believe that the Government has already made a purchase of 8000 tons of lead at 8c. per lb. St. Louis, to cover its August requirements, but that no official announcement has been or will be made. The future of the lead market is full of uncertainty, and depends entirely upon Government demands. If these are of sufficient volume to take up the ordinary slack in the market, production will be kept up at full pace, and the market will continue strong. At 8000 tons per month the Government would use about one-fourth of the country's yearly output. The market is now

extremely dull, but firm and almost nominal. Labor troubles which were prominent last week seem to have been settled in many cases. The extent to which transportation and labor troubles may interfere with output in the future is receiving some consideration. Quotations have been practically unchanged the entire week at 10.75c. St. Louis, and 10.87½c. New York, with a slight recession on Aug. 2, 3 and 4.

Spelter.—The market continues in its stagnant and lifeless condition. A few dealers report a little more activity, but it is not widespread. Prime Western is obtainable for early delivery at 8.50c., St. Louis, or 8.75c., New York, which means as far ahead as September, beyond which time some are unwilling to quote while others demand as high as 8.67½c. to 8.75c., St. Louis, or 8.87½c. to 9c., New York. The interesting feature of the week has been the inquiry put out by the Government for bids on 11,500,000 lb. of Grade C spelter, which is nearly the same as prime Western, though of a little better quality as to impurities. It has been a surprise to the entire trade that this procedure was followed instead of a price being fixed as in the buying of Grades A and B, referred to last week. Bids will be opened on Friday of this week. The question of ascertaining a cost price still goes slowly on, and the market continues deadlocked.

Antimony.—Demand is at a low ebb, and the market is dull, with Chinese and Japanese grades quoted at 15c. to 15.50c. per lb. New York, duty paid.

Aluminum.—The market is inactive and unchanged at 50c. to 52c. per lb., New York, for No. 1 virgin metal, 98 to 99 per cent pure.

Old Metals.—The market is a little higher. Dealers' selling prices are nominally as follows:

	Cents per lb.
Copper, heavy and crucible.....	27.00 to 28.00
Copper, heavy and wire.....	26.00 to 27.00
Copper, light and bottoms.....	24.00 to 24.50
Brass, heavy.....	18.50 to 19.50
Brass, light.....	14.00 to 14.75
Heavy machine composition.....	24.75 to 25.25
No. 1 yellow rod brass turnings.....	17.50
No. 1 red brass or composition turnings.....	19.00 to 21.00
Lead, heavy.....	9.25 to 9.375
Lead, tea.....	7.75
Zinc.....	6.75

Chicago

The metal market continues to show a quiet trend. Copper is firmly held. Interest in tin has been of the routine sort. Lead is fairly strong, though inactive. Spelter continues lifeless; antimony likewise. We quote as follows: Casting copper, 28.50c.; Lake, 30c.; electrolytic, 29c.; tin, carloads, 64c., small lots, 66c. to 67c.; lead, 10.75c.; spelter, 8.37c. to 8.50c.; sheet zinc, 19c.; antimony, 17c. to 18.50c. On old metals we quote buying prices for less than carload lots as follows: Copper wire, crucible shapes, 23c.; copper clips, 22c.; copper bottoms, 21c.; red brass, 22c.; yellow brass, 15c.; lead pipe, 8c.; zinc, 6c.; pewter, No. 1, 35c.; tinfoil, 40c.; block tin, 45c.

St. Louis

AUGUST 6.—Non-ferrous metals have been quiet and in some cases a little firmer during the week, though this latter does not apply to the Missouri product. The close to-day on car load lots was: Lead, 10.92½c.; spelter, 8.37½c. to 8.50c. In less than car load lots, the quotations were: Lead, 11.25c.; spelter, 9.50c.; tin, 68c.; lake copper, 31.50c.; electrolytic copper, 31c.; Asiatic antimony, 18c. In the Joplin district there was a better demand for the high-grade zinc ores, but the price range remained at \$65 to \$75 per ton, basis of 60 per cent metal, the average for the week being \$69 per ton for the district. Calamine ranged from \$35 to \$42 per ton, basis of 40 per cent metal, with the average for the district at \$38 per ton. The output from the Oklahoma section of the field is increasing, but elsewhere there is a reduction because of the prices prevailing. Lead ore was steady at \$110 per ton, basis of 80 per cent metal. On miscellaneous scrap metals we quote dealers' buying prices as follows: Light brass, 10.50c.; heavy yellow brass, 13c.; heavy red brass and light copper, 15c.; heavy copper and copper wire, 20c.; pewter, 25c.; tinfoil, 42c.; lead, 7c.; zinc, 6c.; tea lead, 4c.

ANOTHER BIG SHIP PLANT

United States Steel Corporation Acquires Site Near Mobile, Ala.

The United States Steel Corporation will build a steel shipbuilding plant near Mobile, Ala., according to an announcement made this week by President George G. Crawford of the Tennessee Coal, Iron & Railroad Co., Birmingham, Ala. Beyond officially announcing the purchase of land for the shipbuilding plant, President Crawford makes no statement now, but it is understood that the proposed plant will be one of the largest in the United States, will cost about \$30,000,000 and take two years to construct. The presumption is that the construction of the new shipbuilding plant and the 110-in. plate mill at Fairfield, Ala., announcement of which was recently made, will proceed simultaneously.

The Tennessee Coal, Iron & Railroad Co. is expected to extend the Birmingham Southern Railroad seven miles to the south, reaching navigable water on the Warrior River, where a river terminal will be built, and steel carried thence by water to Mobile.

This shipbuilding plant, with that of the Federal Shipbuilding Co., will make the Steel Corporation one of the largest shipbuilders of the country. The Federal Shipbuilding Co., which was recently incorporated, has been organized and officers have been elected. An office and engineering department have been located on two floors of the building at 54 Dey Street, New York, and plans are being carried out rapidly for erecting the plant on Newark Bay. Judge Gary is president of the Federal Shipbuilding Co. Robert MacGregor is vice-president and general manager. Other directors and officers are Joshua A. Hatfield, president American Bridge Co. of New Jersey; Richard Trimble, secretary and treasurer of the Steel Corporation, and William J. Filbert, controller of the Steel Corporation.

Of the \$6,000,000 appropriated by the Steel Corporation for the Federal plant about \$2,000,000 has been spent for the site, and the remainder will be divided about equally between buildings and equipment. Some of the machinery will be built by the American Bridge Co. It is expected that the first keel will be laid in December.

Steel Rail Exports

Exports of steel rails continue at a high rate. From Government data the following table has been prepared:

1917	Gross Tons
January	76,493
February	46,153
March	52,469
April	38,410
May	49,260
Total	262,785
Calendar year 1913	460,553
Calendar year 1914	174,680
Calendar year 1915	391,379
Calendar year 1916	540,349

The rate in the first five months of this year is greater than it was in 1916 and considerably larger than in 1913 when rail exports reached their height under normal conditions.

Of 513,076 tons exported in the 10 months to May 1, 1917, the amount taken by Russia is the largest—101,097 tons. The West Indies and Bermuda are credited with 77,559 tons, Canada with 61,727 tons, South America with 21,520 tons and Japan with 9359 tons.

The Provincial Hydro Electric Commission of Ontario has taken over the plant of the Ontario Power Co., at Niagara Falls, Ont. The plant was recently purchased by the Commission at \$22,000,000 \$13,000,000 of which is represented in bonded indebtedness to the company, and it is understood, will form an important link in the Chippawa Creek-Queenston Heights development scheme, the ultimate capacity of which will be 900,000 hp. The Ontario Development Co. has a franchise development of 180,000 hp.

WAR BUYING COMMISSION

Purchases May Be Made for Allies Also—The Steel Cost Inquiry

WASHINGTON, Aug. 7.—Plans for detailing members of the War Industries Board to serve as purchasing commissioners for the American Government and for the Allies were discussed at a meeting of the board held at the White House yesterday and participated in by President Wilson. All the members of the board were present and by the President's invitation Secretary Daniels also attended the conference. At the request of the board President Wilson outlined his views with respect to the advantages that should be given the Allies in buying war materials in this country, taking the ground that substantially the same price concessions obtained by this Government should be accorded all the European nations allied with the United States in the war on Germany. The President did not express himself as to purchases for private foreign interests and it was understood that the War Industries Board will consider only the buying of material intended strictly for the prosecution of the war.

While the plans of the board with respect to buying material have not yet been worked out in detail it is understood that a purchasing commission for the American Government will be organized with Bernard M. Baruch as chairman and including Robert S. Brookings and Herbert Hoover, the latter to serve as buyer of food products. As chairman of this commission Mr. Baruch will not only buy raw materials for the American Government and exercise a general supervision of other purchases but it is understood he will ultimately be designated to make all purchases for the Allies. This arrangement will leave Chairman Scott of the War Industries Board free to devote himself to the technical problems of procuring war material and standardizing the requirements of the Government and the equipment of private manufacturers.

To avoid duplication of work and to take advantage of the organizations already in existence in the War and Navy Departments the purchasing commission of the War Industries Board will leave the actual making of contracts in the hands of the purchasing bureaus of the departments, Army contracts being signed by Colonel Palmer E. Pierce and those for the Navy by Rear Admiral Frank F. Fletcher, both of these officers being members of the War Industries Board.

No information has been made public during the past week with regard to the progress of the Federal Trade Commission in fixing the basis for steel prices. This is somewhat significant in view of the fact that the commission to-day gave out a brief bulletin promising to lay before the President within two weeks its report upon the cost of producing copper. This bulletin is as follows:

The Federal Trade Commission's investigation into the cost of producing copper, under supervision of Commissioner Colver, is progressing favorably. Dr. L. H. Haney is in direct charge of the details of this phase of the commission's investigation of metal costs. The field reports are now coming in rapidly and the Commission hopes to have all reports in and results ready for submittal to the President within two weeks. None of these figures will be given out at the commission. If given out at all they will be made public at the White House.

None of the investigations undertaken by the commission to determine the cost of producing the various metals, coal, petroleum, etc., presents anything like the complicated aspect of the inquiry into the cost of making steel. While no conclusions are yet in sight, a large staff of the commission's experts are working with great energy and it is promised that the figures will be laid before the President at the earliest possible moment.

PERSONAL

Thomas E. Durban, for 25 years general manager Erie City Iron Works, Erie, Pa., has resigned and will hereafter devote his time to his position as commissioner representing boiler manufacturers of the country in behalf of the American Society of Mechanical Engineers Uniform Boiler Code, with offices in the Commerce Building, Erie.

Peter Blackwood has severed his connection with the Blackwood Steel Foundry Co., Springfield, Ohio. He has not yet announced his future plans.

Henry M. Wood has resigned from the Lodge & Shipley Machine Tool Co., Cincinnati, to become associated with Axel Malm in the Malm & Wood Machine Co., Dayton, Ohio, manufacturing rotary presses and dies. The company heretofore operated under the name of the Malm Machine Co. Mr. Malm is president and mechanical engineer of the new firm and Mr. Wood vice-president and general manager.

Harry T. Streaker, Lancaster, Pa., has become superintendent of the local foundry of the Champion Blower & Forge Co.

Charles H. Purdy, superintendent Dalton Machine Co., 1911 Park Avenue, New York, has resigned, to design and construct special machinery, with office at 103 East One Hundred and Twenty-fifth Street.

William H. Ellis, Chicago, has bought an interest in and been elected general manager of the Two Rivers, Wis., Plating & Mfg. Co., which recently erected a large factory addition. He formerly was associated with the International Harvester Corporation.

S. J. Williams, for the last year deputy of the Industrial Commission of Wisconsin, in charge of building inspection, has been advanced to the position of engineer, in charge of safety and sanitation work. He fills the vacancy caused by the resignation, a year ago, of C. W. Price, who became associated with the National Safety Council.

F. O. Ebeling, general superintendent DePere Mfg. Co., DePere, Wis., formerly the Lyons Boiler Works, and now controlled by the Joliet Bridge & Iron Works, has resigned to accept a position with Gage Bros. Mfg. Co., Chicago. He is succeeded by Ward Clark.

Harold H. Hamilton, for twelve years president Whiting Mfg. Co., Bridgeport, Conn., has resigned to devote his entire time to the new organization of Hamilton & DeLoss, Inc. He was presented with a watch by the department heads of the Whiting Mfg. Co.

H. E. Harris, president and general manager H. E. Harris Engineering Co., Bridgeport, Conn., has been elected chairman of the Bridgeport section of the American Society of Mechanical Engineers, formed July 31. F. R. Pleasanton, chief engineer Remington Arms-U. M. C. Co., Inc., is vice-chairman. R. W. Ellingham, assistant superintendent, Remington Arms & Ammunition Co., is treasurer; E. Leslie Fletcher, Fletcher-Thompson, Inc., Bridgeport, is secretary, and Charles M. Burgess, New Britain, Conn., is chairman of the membership committee.

W. J. Longmore, purchasing agent at East Pittsburgh for the Westinghouse Electric & Mfg. Co., has been promoted to general purchasing agent at the Pittsburgh offices. Other changes are the promotion of Charles G. Taylor from assistant purchasing agent to purchasing agent of the East Pittsburgh, Shadyside, Cleveland and Newark plants, and the promotion of A. W. Fullerton from purchasing agent of the machine works to purchasing agent of the East Pittsburgh, Trafford and Essington machine works.

Frank B. Ward, representing the Elwell-Parker Electric Co., Cleveland, maker of electric storage battery trucks and tractors; the J. D. Fate Co., Plymouth, Ohio, builder of gasoline locomotives; the Nazel Engineering & Machine Works, Philadelphia, pneumatic forging hammers; the Vulcan Iron Works, Wilkes-

Barre, Pa., locomotives, and other manufacturers, has taken offices at 501 Park Building, Pittsburgh.

Morris Lee Sternberger, Jr., president, and Samuel Edward Sternberger, vice-president and general manager, Wellston Iron Furnace Co., Jackson, Ohio, announce that by court decision their names have been changed to Morris Lee Stephenson and Samuel Edward Stephenson, respectively.

George Giffault, formerly with Fitz, Dana & Brown, metals, has become associated with the Baltimore Copper Smelting & Rolling Co., at New York. The New York office for the sheet copper department has been moved to 128-130 Fourth Avenue, near Union Square, and a stock of the products of the American Smelting & Refining Co. is carried, including ingot copper, pig tin, lead and spelter. W. C. Dickey is New York manager.

William A. Greaves, one of the founders of the Greaves-Klusman Machine Tool Co., Cincinnati, has sold out his interest in that firm to the remaining directors. William B. Dickson has been appointed general manager.

S. M. Hershey, formerly with the Hyatt Roller Bearing Co., Newark, N. J., and the Norton Co., Worcester, Mass., has been placed in charge of an office opened by the Heald Machine Co., Worcester, Mass., manufacturer of grinding machines in the Commonwealth Building, Philadelphia.

W. C. Rowley, for some time a member of the board of directors of the Federal Motor Truck Co., has been elected vice-president in charge of sales, succeeding J. F. Bowman, resigned. He was with the Michigan Central Railroad for 32 years, becoming general freight agent at Detroit.

W. J. Ogden has resigned as superintendent of the forge department of William Wharton, Jr., & Co., Easton, Pa., to engage in the forging business at Perkasio, Pa. In conjunction with H. Boyd he has formed the Perkasio Forge & Machine Company.

Thomas B. Jones has been appointed a member of the Exports Administrative Board at Washington representing the Department of Commerce and succeeding Edward N. Hurley, recently transferred to the chairmanship of the United States Shipping Board. Mr. Jones was nominated by the President for membership on the Federal Reserve Board when that body was originally organized, but was rejected by the Senate after a protracted contest. Confirmation by the Senate of members of the Exports Administrative Board is not required. Mr. Jones is a well-known business man and capitalist of Chicago and has had much experience calculated to fit him for service in his new post.

De Courcy Browne, metallurgical engineer, Goldschmidt Thermit Co., 120 Broadway, has been commissioned a second lieutenant in the ordnance department of the U. S. Army, and is connected with the second training company, Coast Artillery Corps, Fortress Monroe, Va.

John Duncan, vice-president Wheeling Steel & Iron Co., Wheeling, W. Va., who had a major operation on July 21 at a hospital in Pittsburgh, is making satisfactory progress toward recovery.

H. L. Kaufman, Cleveland representative for years of E. N. Breitung & Co., Marquette, Mich., ore miners and shippers, has withdrawn from the firm and returned to Marquette. It is understood he will enter the banking business in New York City.

Edward Worcester, first vice-president and general manager of sales of National Tube Co., Pittsburgh, has gone to Maine on a month's vacation.

George A. Mason, in charge of sales of the wire and wire nail departments of Jones & Laughlin Steel Co., Pittsburgh, has gone to Canada on his annual vacation.

J. W. Kelly, for eight years purchasing agent of the Riter-Conley Mfg. Co., Leetsdale, Pa., has resigned and opened offices in the Second National Bank Building, Pittsburgh, as manufacturer's agent. He is representing the Mahoning Foundry Co., Punxsutawney, Pa., producer of gray iron, brass and bronze castings.

Fred G. Lange, formerly chief accident agent of the Youngstown Sheet & Tube Co., Youngstown, Ohio, has

been appointed deputy safety inspector of the Ohio Industrial Commission. In his new capacity he will serve both as inspector and as instructor of deputies. He will be stationed at Columbus.

George F. Alderdice, vice-president of Brier Hill Steel Co., Youngstown, Ohio, has recovered from an operation for appendicitis performed recently.

Fred Corll, formerly superintendent of the open-hearth department of the Farrell, Pa., works of the Carnegie Steel Co., has resigned to accept a similar position with the Cambria Steel Co., Johnstown, Pa. Norman S. Powell, superintendent of the North Works open hearth, will succeed Mr. Corll at Farrell. Mr. Powell will be succeeded by Joseph Cooper.

OBITUARY

ALBERT F. GANZ, professor of electrical engineering at Stevens Institute of Technology and a well-known consulting engineer, died July 28 at his home in Hoboken, N. J. He was born in Germany, April 25, 1872, came to this country with his parents in 1881 and graduated from Stevens in 1895. He was appointed professor of electrical engineering in 1902. Professor Ganz was a fellow of the American Institute of Engineers and the American Association for the Advancement of Science. He was a member of the American Society of Mechanical Engineers and other engineering societies.

HORACE BROCK, Mt. Lebanon, Pa., died early Aug. 4 at the Orthopedic Hospital, Philadelphia, of infectious pneumonia. He was 64 years old, and a son of the late John Penn Brock. He was formerly active in the affairs of the North Lebanon furnaces and the American Iron & Steel Co., of which he was treasurer for many years. He is survived by a widow and two children, John Penn Brock, manager of the American Iron & Steel plant at Lebanon, and Mrs. Quincy Bent, wife of the general manager of the Bethlehem Steel Co. plant at Steelton.

WILLIAM I. BABCOCK, head of the firm of Babcock & Penton, naval architects, 120 Broadway, New York, and son of the late Capt. David S. Babcock, died Aug. 7 at his home in New York in his sixtieth year. Mr. Babcock was connected with the Chicago Shipbuilding Co. a number of years ago, and later became associated with Henry Penton, who was then with the same company and is now a resident of Cleveland. Mr. Babcock was a member of the Engineers' Club and other engineering societies.

OTTO P. STEHN, general sales manager of the Hydraulic Pressed Steel Co., Cleveland, died Aug. 5 in Baltimore, Md., where he had been spending some time for medical treatment. He was about forty years of age and had been connected with the Hydraulic Pressed Steel Co. for six years. Before becoming associated with that company he was for some time Cleveland sales manager of Manning, Maxwell & Moore, Inc.

JACOB FISCHER, aged 69, president Indiana Stove Works, Evansville, Ind., died July 28, at his home in that city. He was born in Germany and had lived in Indiana from his boyhood.

ISAAC G. HAAS, president of the Empire Plow Co., Cleveland, died Aug. 1, after an illness lasting several months.

JOHN W. SHANAHAN, superintendent Bissell Carpet Sweeper Co., Grand Rapids, Mich., died July 13.

Blast Furnace Sold

CHICAGO, Aug. 8—(By Wire).—The Stephenson Charcoal Iron Co. has sold its furnace at Wells, near Escanaba, Mich., to the Delta Chemical Co. The latter is owned largely by Eastern capital.

Tin exported from Siam for the fiscal year ended March, 1916, was 20,156,667 lb., valued at \$7,807,703.

AIRCRAFT MAKERS ORGANIZE

Association of Manufacturers Will Put an End to Troublesome Patent Litigation

Organization of the Manufacturers' Aircraft Association will, it is believed, end the litigation over airplane patents, chiefly between the Curtiss and Wright interests. The association has opened offices at 501 Fifth Avenue. Membership is open to "any responsible manufacturer of aircraft, or any one who intends to become a bona fide producer, or any manufacturer to whom the United States Government has given a contract for the construction of ten or more airplanes, or any person, firm or corporation owning or controlling United States patents relating to airplanes."

Fay L. Faurot, chairman of the publicity committee of the association, has made an official statement in part as follows:

By the terms of their agreement the various patents owned by the individual members are to be taken over and so cross-licensed that their use may be made universal to all engaged in the industry. This action comes as a result of a number of conferences held in Washington by the members of the National Advisory Committee for Aeronautics and the officials of the Army and Navy and the Manufacturers Aircraft Association.

The directors of the association are: Frank H. Russell, of the Burgess Co., Marblehead, Mass.; Albert H. Flint, L. W. F. Engineering Co.; John P. Tarbox, Curtiss Aeroplane & Motors Corporation; Harry Bowers Mingle, Standard Aero Corporation; B. S. Foss, Sturtevant Aeroplane Co.; George H. Houston, Wright-Martin Aircraft Corporation, and H. E. Talbot, Jr., Dayton-Wright Aeroplane Co.

The officers of the association are: Frank H. Russell, Burgess Co., president; Albert H. Flint, L. W. F. Engineering Co., vice-president; Harry B. Mingle, Standard Aero Corporation, treasurer, and Benjamin S. Foss, Sturtevant Aeroplane Co., secretary, and Benjamin L. Williams, assistant secretary.

By the terms of the cross-licensing agreement any responsible manufacturer of aircraft, or one who intends to become a bona fide producer of same, or any manufacturer to whom the United States Government has given a contract for the construction of ten or more airplanes, or any person, firm, or corporation owning or controlling United States patents relating to airplanes may become a party to the voting trust agreement, provided for in the by-laws, and can qualify as a member.

It is the purpose of the association not to curtail, but to open up the industry in order that the Government officials and airplane manufacturers may not at this time be under any improper or unfair restraint. All patent litigation relating to airplanes between members of the association ceases automatically, and the airplane industry is therefore left free to expand to any limits desired or required by the unusual demands of the war.

Secretary of the Navy Daniels has announced that the Government will build an aircraft factory for the navy at a cost of about \$1,000,000 for buildings and machinery. The plant will be located at the League Island Navy Yard, Philadelphia.

Pittsburgh Steel Product Co.'s New Plant

Property amounting to about 300 acres recently purchased by the Pittsburgh Steel Products Co., Pittsburgh, and located between the boroughs of Allenport and Stackdale, Washington county, Pa., facing the Monongahela River, will be used for extending the operations of the company in the manufacture of seamless steel tubes. This company for some years has operated at Monessen, Pa., a large plant in the manufacture of seamless steel tubing from 1 in. diameter up to 6 in., the annual capacity being about 60,000 tons. Its property at Monessen does not permit of future extensions, and the company decided to erect its new tube mills at Allenport. Plans so far decided upon and work on which construction has already started include the erection of tube mill buildings similar to those at Monessen, the building of a sea wall along the Monongahela River as a protection against floods, the construction of a pumping station, also a large power plant, including electrical equipment. All mills in the new plant will be motor driven.

CORRESPONDENCE

Welded Cast Steel Ship Sections

To the Editor: The comments of Mr. Sandor I. Oesterreicher in your July 26 issue and his deep interest in advancing the arts of welding and casting for ship building purposes to meet the submarine menace are welcomed as valuable contributions throwing new and unexpected lights upon the subject.

His idea that welding cast-steel ship sections will be the death of electric welding might well be elucidated by giving his reasons. When so doing the experience of the Wilson welding system in ships during the last few months should be given consideration.

Mr. Oesterreicher "guesses" that the Wilson system uses a constant potential, multiple arc system. His guess is correct. He quotes a statement from a Wilson patent to the effect that the unsteadiness of an operator's hand and the wide ampere variations resulting caused a porous weld. This statement referred to the problem that Mr. Wilson solved. His solenoid and carbon pile eliminate porosity, so that the weld is dense and tough,—in fact the joint is filled with steel containing manganese capable of scientific predetermination as to quantity, to produce the degree of tensile strength and ductility desired.

The speed of welding depends on many factors,—the thickness of the plates to be welded, the size of the welding electrode, and the amount of current used.

Mr. Oesterreicher appears to be entertained at the idea of one hundred 5000-ton ships from each of ten ship yards per month. And justly so. Through some error somewhere "ten" was printed in the daily press as "one hundred."

It is planned to build ships of about 9100 tons d.w.c. and a total of as many as can be built. Fifty-five ships per month require 2,000,000 tons of steel more or less, and furnaces to reduce the ore and purify it for casting are the chief problems. Two blast furnaces have just been completed within 57 days. A dozen might be necessary,—perhaps more. And open-hearth furnaces to match. It is a big undertaking. The highest order of engineering is required. Casting has reached such a satisfactory stage and now welding has just equalled it, that the casting and welding of ships, while new and revolutionary to the naval architect, may be said fairly to have been brought within the realms of straight engineering.

MYRON F. HILL.

New York, Aug. 6.

The Unfairness of the Senate Bill Tax on Excess Profits

To the Editor: Two conditions should be met in the special tax legislation now before the Senate at Washington. They are especially important because of the enormous sums involved. If these two conditions are met, the taxes will be raised and paid with patriotic cheerfulness:

1. Incidence of the tax should be fair and just to all.
2. The tax must not be beyond the ability of the taxpayer to pay.

As to the first, I feel that the method provided in the Senate bill is essentially unjust and unfair. Let me illustrate. Assume two corporations each having \$500,000 invested as capital Jan. 1, 1917, and each during 1917 earning net 35 per cent, or \$175,000. A had normal earnings in 1911, 1912 and 1913 of 20 per cent, or \$100,000; B normal earnings during 1911, 1912 and 1913 of less than 6 per cent, which by Senate bill allows them to assume 6 per cent earnings, or \$30,000 normal earnings. By Senate bill A pays no excess profits tax up to \$100,000. A pays excess profits tax as follows:

A has earnings of \$175,000, less \$100,000 normal in-

come, or \$75,000 on which excess tax is collected, and will pay as follow:

12 per cent on first 15 per cent of \$100,000, or.....	\$1,800.00
16 per cent on succeeding 10 per cent (15-25 per cent) of \$100,000	1,600.00
20 per cent on succeeding 25 per cent (25-50 per cent) of \$100,000	5,000.00
25 per cent on succeeding 25 per cent (50-75 per cent) of \$100,000	6,250.00

This completes A's excess profits payment, making a total of \$75,000 on which excess profits is laid, which with the normal earnings of \$100,000 equals the total earnings of \$175,000. The total of the excess profits tax which A pays would be \$14,650.

Corporation B pays on excess profits above \$30,000, or on \$145,000. B pays 12 per cent on \$4,500, 16 per cent on \$3,000, 20 per cent on \$7,500, 25 per cent on \$75,000, 30 per cent on \$7,500, 35 per cent on \$15,000, 40 per cent on \$15,000, 45 per cent on \$15,000 and 50 per cent on \$70,000. B thus pays \$59,625 on the same capital and same earnings on which A pays but \$14,650.

Surely this does not seem fair. If what A pays is right, then B is certainly paying too much, and vice versa. The unfortunate working out of this is that corporation B with failure staring it in the face in 1911, 1912 and 1913—for no commercial corporation can endure on a 6 per cent or less earning capacity—is compelled in 1917 and thereafter not only to compete with its much more successful rival of 1911, 1912 and 1913 and its larger earnings, but is severely penalized in the matter of taxation, thus further handicapping it in a competitive race. It is penalized first because its excess profits taxation is on a much larger amount, and further because by reason of the percentage applying to a smaller initial amount, corporation A finds 25 per cent the extreme limit it is compelled to pay on any portion of its excess profits, while corporation B is compelled to pay from 30 to 50 per cent on more than 80 per cent of its excess profits.

Surely any principle which produces such inequitable results is essentially wrong. The question what caused the prosperity of corporation B in 1917, in contrast with 1911, 1912 and 1913, really is not a matter which ought to control with B any more than with A. Corporation B in any event needed the prosperity a good deal worse than corporation A, is less able to pay the tax, and certainly should not be taxed in excess of A.

Two brief suggestions: One is that a large part of both A's and B's profits in 1917 arise out of appreciation of raw materials, and this profit later on will gradually appear in the loss column as materials go down.

The other: The idea of the normal year's earnings, as I understand, is copied after England's law. It should be remembered, however, that during the period prior to the war and roughly covered by 1911, 1912 and 1913 the industries in England were generally earning a large rate of return on their investment, so that a normal income might be for the general run of English concerns as much as 20 per cent, and excess profits began beyond that percentage. If this be true, English corporations are in much better condition to stand a heavy excess profits tax than many of our American corporations.

Another idea I would like to present as briefly as possible is that too heavy a tax will bring about failure on the part of a number of our commercial corporations. Increasing business and increasing sales have called for increasing capital. This is not usually in the smaller corporations secured by sales of stock. A very large proportion of moderate sized corporations, at least, rely upon their banking facilities largely for aid in extending their business and for the supplying of capital.

Take corporation B with \$500,000 of capital Jan. 1, 1917. Likely we shall find, even in a good wholesome corporation, this condition of affairs approximately to exist:

Accounts payable	\$25,000
Bills payable to bank.....	100,000

To support this bank and current indebtedness, sound banking usually calls for approximately twice the indebtedness in liquid assets on the part of the borrowing corporation. Thus such a corporation would

need to have clear \$200,000 to \$250,000 of liquid assets to sustain its indebtedness of \$125,000, of which \$100,000 is bank indebtedness. These liquid assets consist mainly of book accounts, raw, semi-finished and full-finished material or merchandise, and not, as is many times supposed, of money in bank. Money in bank is usually with most corporations the smallest item of their assets.

Practically, what is a corporation then to do, if the burden of taxation is piled on, as is indicated in the case of corporation B? What will be its situation? It can scarcely go to the banks for a great portion of the money it will need to pay the Government next year, for the total resources of all the banks will not probably permit of the banks financing a large proportion of the income tax payments of various sorts, all of which have to be paid approximately at the same time. Either the corporation will be unable to make the payment called for, in which event it is ruined, or it must at an early date set about retrenching instead of extending, at a time when extension in many industries is needed badly. It will have to set about reducing its bank indebtedness. To do that it will need to restrict its trade, reduce its stock and absolutely abandon all thoughts of expansion of its business. In that event, even the very effort to take in sail, to provide funds to meet taxation on excess profits, will destroy the possibility of profit and thereby defeat the Government's own purpose.

My plea, therefore, is as to these two points only: First, make the tax so that it will bear equally and fairly on all on whom it falls and not favor the ultra prosperous ones at the expense of those who have barely escaped substantial failure during the depressing years which preceded the war. Second, let the tax not exceed in amount such percentage of profits as will still leave it possible to the taxpayer to make payment of taxes and continue to exist.

In addition to the excess profits tax, of course, there is the heavy normal tax to be paid as well. Practically, how and where are many of these corporations to get the money with which to pay these taxes?

J. E. DURHAM,

President Bonney Vise & Tool Works, Inc.
Allentown, Pa., Aug. 3, 1917.

Orders for Nine Heroult Electric Furnaces

Licenses for the installation of the following Heroult electric steel furnaces have been issued by the United States Steel Corporation:

The General Electric Co., West Lynn, Mass., will install one 6-ton furnace for making steel castings.

The Taylor-Wharton Iron & Steel Co., High Bridge, N. J., will install one 6-ton furnace for making steel castings. This is in addition to one 3-ton recently ordered.

The Crucible Steel Co. of America will install one 6-ton furnace at its Park Works, Pittsburgh, for making special steels. This supplements several furnaces of the same types already operating or ordered.

The Pennsylvania Engineering Works, New Castle, Pa., will install one 6-ton furnace for making steel castings.

George C. Warner, Fulton, N. Y., will install one 1-ton furnace for making steel castings under the name of a company still to be formed.

The United States Government, as previously forecasted in THE IRON AGE, has placed an order with the Corporation for three 6-ton furnaces to be installed in its new projectile plant at Charleston, W. Va., and also one 6-ton furnace for making steel castings at the Naval Gun factory, Washington, D. C.

The installation of these nine furnaces brings the total number of this type operating or contracted for in the United States and Canada to 134.

Appraisalment of the properties of the Sloss-Sheffield Steel & Iron Co. in Alabama is being made by W. L. Klutts, general manager Sheffield Coal & Iron Co., Warner Shook, former manager Central Coal & Iron Co.'s furnace, and H. S. Geismer. This is being done for the information of the directors of the company as a basis for future developments, a large by-product plant being considered among other things.

Japan's Large Share in Exports of Steel Plates

Unprecedented exports of steel plates have been made and are being made from the United States. The total for the first five months of this year of 209,197 gross tons nearly equals the exports in 1913 of 223,814 tons and those of the entire year 1915 when they were 222,472 tons. The proportion going to Japan is significant. The following table gives the official Government exports of steel plates over certain periods and also gives the total of steel plates and sheets sent to Japan in the corresponding periods, in gross tons:

1917	Plate Exports	Plates and Sheets to Japan
January	38,903	19,177
February	26,395	12,680
March	41,439	20,932
April	47,611	29,595
May	54,849	.....
	209,197	.....
10 months ended Apr. 30, 1915.	85,747	6,058
10 months ended Apr. 30, 1916.	229,938	53,189
10 months ended Apr. 30, 1917.	306,305	138,565
Calendar year 1913.....	223,814	7,250
Calendar year 1914.....	111,552	3,275
Calendar year 1915.....	222,472	37,119
Calendar year 1916.....	276,034	89,458

It will be seen that steel plate exports for the 10 months ended April 30, 1917, which were 306,305 tons, not only exceeded the record of 276,034 tons in the full year 1916 but were over one-third more in 10 months than in the pre-war record year of 1913. The increase has also been progressive from January to May this year excepting the decrease in February, due possibly to submarine warfare.

Striking too is Japan's proportion of these exports. From about 50 per cent of the total plates in January, February and March, the proportion in April was still larger. This trend is more evident in the relation between the ratio for the 10 months ended April 30, 1917, and for the calendar year 1916.

Armor Plate Plant Not to Be Built

WASHINGTON, Aug. 7.—Reports published in the daily press during the past week to the effect that the Government is about to award contracts for 25,000 tons of structural steel for the armor plant for which a site has been provided at Charleston, W. Va., are pronounced by officials of the Navy Department to be entirely without foundation. Some months ago the requirements of the plant were carefully figured and tabulated in connection with the steel required for the projectile plant and for all other buildings which the Navy Department has had in view for war purposes and for the permanent naval establishment. From time to time inquiries have been made concerning the availability of this steel and orders have been given for various lots, the delivery of which in the near future was desired. So far as the armor plant is concerned, however, Secretary Daniels recently made the official announcement that as this establishment could not be completed in time for its product to be of use in winning the war, its construction had been postponed. There has been no change in the status of the matter. As heretofore stated in this correspondence, the impression is strong that the proposed armor plate plant will not be built but that all armor needed by the Navy will be purchased from private establishments on the basis of prices to be fixed by the Federal Trade Commission or by the President on cost data gathered by the commission.

Has Not Purchased Interest in Mine

THE IRON AGE is advised by W. A. Thomas, president of the Brier Hill Steel Co., Youngstown, Ohio, that the report that his company had purchased a half interest in the Dunwoody ore mine on the Mesaba range, Minnesota, is untrue.

EXEMPTIONS OF EMPLOYEES

Plant Managers in War Industries Need to Take Energetic Action

WASHINGTON, Aug. 7.—The serious question of preventing inroads upon the organizations of munition makers and other manufacturers having Government contracts by the war draft has been put squarely up to the employers. Only courageous and vigorous action can prevent well-meaning but over-zealous officials from depleting the labor forces of many establishments, and industrial managers should not hesitate to act with energy in view of their knowledge of the effect upon the interests of the Government itself of any breaking down of manufacturing efficiency in the crisis now confronting the country.

The President's proclamation calling upon private establishments to refrain from assisting in procuring exemptions for employees except where they are "absolutely indispensable" was outlined in THE IRON AGE last week, together with certain rulings promulgated under the authority of Provost Marshal General Crowder. During the last few days the situation has become much more acute, however, due to a variety of causes. A very large proportion of drafted men who have been found physically fit have indicated their intention to seek exemption, the majority of the claims being based apparently on the alleged dependence of families or relatives. A very large number of young men have contracted marriages apparently for the sole purpose of securing exemption from the draft. To meet these conditions the War Department officials are preparing to pursue a drastic course, and machinery is being set in motion designed to reduce exemptions to a minimum. While the aim of the authorities is legitimate and proper, there is reason to believe that the strong measures being taken will result in embarrassing certain industries highly important to the Government rather than in reaching the particular "slackers" at which they are aimed.

No Exemptions by Industries

The instructions originally issued by the President and the Provost Marshal General were addressed to local exemption boards. These were followed up by a ruling forwarded to the Coal Production Committee of the Council of National Defense holding that the War Department will not recognize exemptions by industries and that the indispensable relation of each workmen to his employment can alone be considered. General Crowder has now issued a new and comprehensive order addressed to district boards to which appeals from local boards lie, and the War Department has appointed an official challenger for every local board, thereby guaranteeing the taking of an appeal on behalf of the Government against practically every ruling of the local boards granting exemption except in the case of physical disability. In issuing this order General Crowder declares that the interest of the nation solely must be subserved and that "consequently industrial exemptions should be granted only to men absolutely essential to the conduct of a business which itself is essential to the proper prosecution of the war." The question in an individual case, he says, is always two-fold:

1. Is the industry in question necessary to the maintenance of the military establishment or the effective operation of the military forces or the maintenance of the national interest during the emergency?
2. Does the person by or in respect of whom the discharge is claimed occupy such a status in respect of such a necessary industry that his place could not be filled by another without direct substantial material

loss and detriment to the adequate and effective operation of the particular enterprise?

There may be many cases, General Crowder asserts, where discharges will be claimed on circumstances "that raise a question of private loss or hardship rather than of national necessity," but such cases, he asserts, "are without the power of district boards to relieve." Wherever local boards have sought to grant such exemptions the official challenger is directed to step in and take an appeal to the district board on behalf of the Government.

The Question of Indispensability

Strong representations are being made here by manufacturers having Government contracts that the practical effect of these regulations is to break up working organizations, and appeals are being made to modify the instructions to local and district boards and to challengers. It is pointed out that in a munition plant, for example, the greatest possible difficulty in securing adequate forces of skilled men has been experienced for many months, but that, nevertheless, foremen and managers hesitate to say under oath that any particular employee is "absolutely indispensable" to the efficient operation of the plant. The real question in the mind of the foreman or manager is as to the skill and productivity of the workman who is to be substituted for the drafted man, and in most cases this cannot be determined until too late to claim exemption for the employee who has been called for military service. Furthermore, according to some of the complaints received here, the serious problem which the employer must consider is not the indispensable character of the individual employee, but the effect upon the organization of the loss of a considerable number of employees called upon to quit work at the same time. Individually no one of these employees may be said to be indispensable, but the efficiency of any given plant would be seriously reduced should any considerable number of workmen be drafted. There are no rules for drawing lines in such cases, and just at this juncture, when the Government appears to be far more concerned in getting soldiers than in protecting manufacturing establishments producing goods for the Army and Navy, many employers find themselves in a very serious quandary.

It is evident, from the present disposition of the authorities in this particular emergency, that manufacturers must adopt a firm course and protect their Government contracts at all costs, assuming, of course, that those contracts relate to the prosecution of the war. Foremen, managers and others should not hesitate to supply their workmen with the necessary affidavits as to the indispensable character of their service where any substantial decrease in plant efficiency is threatened, and the fact should be borne in mind that an adequate army can certainly be secured without taking men engaged in the manufacture of war materials, whereas no war can successfully be waged unless the Government is assured of the prompt delivery of adequate supplies of war material of all kinds.

Pilling & Crane Partnership Dissolved

Announcement is made of the dissolution on Aug. 1 of the partnership of Pilling & Crane which for many years has been one of the most prominent Eastern houses doing business in iron ore, pig iron and coal, having main offices in Philadelphia and an office in New York. T. I. Crane withdraws from the firm and will devote himself to various interests including those of the Northern Ore Co. which operates a zinc property in northern New York and more recently acquired the Island Park blast furnace near Easton, Pa. W. S. Pilling will continue the business under the name of Pilling & Crane.

Machinery Markets and News of the Works

NEARLY ALL WAR BUYING

Private Business Almost Stopped

Machine-Tool Concerns to Aid in Ordnance Work—Gisholt Machine Co. Organizes New Concern to Build Guns

The Government is looking to machine-tool builders to render valuable aid in ordnance work. In addition to the Wisconsin Gun Co., which was recently organized by five leading metal-working concerns of Milwaukee, Wisconsin will have a gun plant at Madison, the Northwestern Ordnance Co. having been organized by officials of the Gisholt Machine Co. and the contract for a building similar to the one being erected by the Wisconsin Gun Co. has been let. There appears to be reason to believe also that the Niles-Bement-Pond Co. may build a similar plant near Kearny, N. J., although no definite information to this effect is obtainable, and the Otis Elevator Co. will probably utilize one of its manufacturing buildings for a gun plant. THE IRON AGE mentioned last week that the Bullard Machine Tool Co., Bridgeport, Conn., had been asked to erect a similar factory. The initiative in the establishment of these plants is said to have come from the Government, which has selected the concerns which were thought to be in the best position to assist materially in the equipment of the United States Army with artillery.

A majority of metal working machinery and machine tool plants is now about 75 to 90 per cent engaged on work directly or indirectly associated with the war program, and with the necessities of the Government still unsatisfied, it will not be many weeks before work for private manufacturers who are taking no part in the great war preparations will have been entirely put into the discard. The process of requisitioning machinery and tools for Government work, which has been going on for many weeks, has almost completely absorbed all the available equipment, and further action along this line will make it necessary for Washington officials to determine whether one class of war work is of more importance than another.

An illustration of this condition is to be found in the efforts made last week by the American Locomotive Co. and the Baldwin Locomotive Works to locate several cranes up to 25-tons capacity, which could be used in building locomotives for the Government railroad in France. Many such cranes are being built, but most of them are for other Government work, and the crane builders were not willing to decide the question of priority.

Government contracts include additional orders for motor trucks aggregating \$21,000,000, making \$44,000,000 worth now contracted for. The new contracts went

to the Packard Motor Car Co., the Locomobile Co. of America and the Pierce-Arrow Motor Car Co. Shell orders are reported to have been placed with the American Car & Foundry Co., the Consolidated Mfg. Co., the American & British Mfg. Co. and the Harrisburg Pipe & Pipe Bending Co. The Colt's Patent Firearms Mfg. Co. is said to have received a large order for machine guns.

Airplane buying will not reach as large a volume as was expected, machine-tool dealers say. Automobile plants will be utilized to a great extent in engine building. However, the Curtiss Aeroplane & Motors Corporation and the Wright-Martin Aircraft Corporation have made some purchases in New York, while Henry M. Leland has bought in the Cleveland market.

The Pennsylvania Railroad Co. has issued another list of tools to be bought for the United States Army engineers going to France to build a railroad system. Westinghouse Church Kerr & Co. have been buying tools in New York for the Rock Island Arsenal, Rock Island, Ill.

The Groton Iron Works, which is building a \$2,000,000 steel shipbuilding plant at New London, Conn., has placed equipment orders aggregating several hundred thousand dollars. The Bath Iron Works, Bath, Me., is expected to buy some equipment for an addition. The Newburgh Shipyards, Inc., Newburgh, N. Y., and the Bayles Shipyards, Inc., Port Jefferson, N. Y., are also in the market for equipment. The Federal Shipbuilding Co. has organized and taken offices at 54 Dey Street, New York, and will soon make substantial purchases.

Foreign business is active. Australia is buying in this market, showing the trend of that country toward manufacturing.

The Pennsylvania Lines West (Panhandle Route) have made appropriations for new machine, tank and boiler shops in Columbus, Ohio, and new tools will be needed, lists for which are expected soon. The Pittsburgh Steel Products Co. will be in the market in a short time for equipment for a seamless tube mill at Allenport, opposite Fayette City, Pa.

Chicago reports that the new Northwestern Ordnance Co. of Madison and the Wisconsin Gun Co. of Milwaukee are placing orders there. The Whitman Agricultural Co. will build a new plant in St. Louis for the manufacture of farm tractors and will need equipment.

Good-sized orders have been placed in Detroit for machine tools. The Packard Motor Car Co. now has Government truck orders aggregating \$16,000,000. In Cleveland the Forest City Machine & Forge Co. has placed orders for 30 screw machines, it having taken a Government contract for detonators. San Francisco reports that the establishment of new shipyards there and the expansion of old ones has greatly stimulated demand for machinery and tools.

New York

NEW YORK, Aug. 7.

It now develops that the United States Government has been negotiating with three machine-tool concerns to build or equip big plants for the manufacture of heavy artillery. The Bullard Machine Tool Co., Bridgeport, Conn., was mentioned in this connection last week, and it is now learned that the Gisholt Machine Co., Madison, Wis., and the Niles-Bement-Pond Co., New York, are included in the same program. The Otis Elevator Co., New York, is also considering a similar proposition. In case this plan goes through, the Bullard, Gisholt and Niles-Bement-Pond concerns will probably build new plants. The Niles-Bement-Pond Co. is understood to have taken an option on property near Kearny, N. J., on which to erect such a plant. The Bullard Machine Tool Co. will, of course, build at Bridgeport and the Gisholt Machine Co. at Madison, the latter company having organized the Northwestern Ordnance Co. and let contracts for a new plant and equipment. The Otis Elevator Co. will use one of its present manufacturing buildings, but will require some change of equipment. Negotiations for these plants have been conducted quietly, and although a number of meetings have taken place in Washington, THE IRON AGE last week published the first intimation that such a plan was being considered.

Government work is becoming almost the sole factor in the machinery and machine-tool trade. It is estimated by various dealers that the metal-working machinery and machine-tool plants of the country are now engaged to the extent of 75 to 90 per cent on work which is directly or indirectly associated with the war program. Crane builders are sold up for nearly a year and are so largely on Government work that it has been very difficult for the Baldwin Locomotive Works and the American Locomotive Co. to locate several cranes up to 25-ton capacity which could be commandeered by the Government to assist in the work of building 300 locomotives for use in France. There are, of course, many such cranes on order in the various plants, but most of them are for other Government work, which was regarded as equally important. Shipbuilders are finding it almost impossible to get delivery of cranes in the time they require them, and they are substituting other methods for conveying material.

Munitions contracts are being given out at Washington, a substantial order for 3 and 4 in. shells having been divided recently among the American Car & Foundry Co., the Consolidated Mfg. Co., Toledo, Ohio, the American & British Mfg. Co., Bridgeport, Conn., and the Harrisburg Pipe & Pipe Bending Co., Harrisburg, Pa. The American & British Mfg. Co. has recently been adding to its equipment, but the Harrisburg Pipe & Pipe Bending Co. is understood to be already well equipped for shell work. The Colts Patent Firearms Mfg. Co., Hartford, Conn., is reported to have obtained a contract for 20,000 Browning machine guns. The Savage Arms Co. has received large additional orders, it is said, for Lewis machine guns.

Machine-tool dealers say that the demand for tools from the airplane industry will not be as large as was expected, it being the policy of the airplane companies to utilize the automobile factories as much as possible rather than await the delivery of new machines. Many automobile plants are exceptionally well equipped, having before the declaration of war purchased additional tools in anticipation of increasing manufacturing output. The Curtiss Aeroplane & Motors Corporation will purchase some tools for its Buffalo and Hammondsport plants and the Simplex plant at New Brunswick, N. J., has bought a few grinding machines for work being done for the Wright-Martin Aircraft Corporation, but the aggregate of such airplane buying, it is said, is not large.

Additional motor truck contracts have been awarded by the Government, aggregating \$21,000,000. These, with the contracts previously given out, make a total of about \$44,000,000 worth of motor trucks now being built for army use. The new contracts call for 3000 Packards, 1250 Locomobiles and 1500 Pierce-Arrows. The quartermaster's depot at Chicago has also been advised to buy 142 light trucks of large chassis and equipped with Babcock delivery bodies for use at the army cantonments, 12 being issued to each place.

The Pennsylvania Railroad Co. has issued another list of additional tools required for the United States Army engineers who will build the new railroad system in France. Westinghouse, Church, Kerr & Co. have been placing orders for machine tools required for the shell-loading plant of the Government at the Rock Island Arsenal, Rock Island, Ill. A large part of the equipment for that plant consists, however, of woodworking machinery.

The Groton Iron Works, headed by C. W. Morse, has placed equipment orders aggregating several hundred thousand dollars for its steel shipbuilding plant at New London, Conn. A complete fabricating shop equipment order was awarded to the Hilles & Jones Co., Wilmington, Del.; five tower cranes of 5-ton capacity each were ordered from the Edward F.

Terry Mfg. Co., and three locomotive cranes from the McMyler-Interstate Co., Cleveland. Orders will soon be placed for bridge cranes for shops and yard gantry cranes. The Federal Shipbuilding Co. has taken two floors at 54 Dey Street, New York, for offices and engineering department and has a force of engineers at work on plans for its plant on the Newark Meadows. It is understood that 14 buildings will be erected, and complete equipment will soon be purchased. Some of the machine tools are being built by the American Bridge Co. The Bath Iron Works, Bath, Me., is said to be building an addition to its plant, for which additional equipment may be needed. The Newburgh Shipyards, Inc., 31 Nassau Street, New York, with plant at Newburgh, N. Y., is buying punching and shearing machinery and other shop equipment. The Bayles Shipyards, Inc., Port Jefferson, N. Y., with office at 115 Broadway, New York, is in the market for equipment for a plate and angle shop and cranes. This concern is preparing to build composite ships.

Inquiries for cranes are frequent, but evoke little enthusiasm because of the sold-up condition of plants. The Southern Pacific Railroad is inquiring for a 120-ton and a 15-ton overhead crane. The Crocker-Wheeler Co., Ampere, N. J., wants two 2-ton cranes. There have been inquiries from abroad as well as for domestic trade.

Foreign business, especially for France, continues active. Australia has been in the market for machine tools, indicating the trend of that country toward manufacturing. It is said that some machine tools are now being made in Australia, and its future as a market for American machine tool builders is said to be excellent.

J. Curthrew Sanders, managing director of Stewart Sanders & Co., Ltd., Johannesburg, South Africa, manufacturer of bolts, nuts, rivets, forgings, etc., is buying bolt and forging machinery in this country. His New York headquarters is at 6 Cliff Street.

The Cary Safe Co., Buffalo, has purchased a site 150 x 360 ft., at Elmwood and Hertel avenues, with Erie Railroad switch, on which it will erect a factory, 100 x 300 ft.

The Sizer Forge Co., Buffalo, is erecting at its plant at Larkin Street, Erie, and Lake Shore Railroads, an electric furnace building, a steel and brick coal house and a covered scrap iron yard, to cost with equipment, \$110,000.

The Curtiss Aeroplane & Motors Corporation, Buffalo, has commenced work on erection of factory building No. 3 at its new plant on Elmwood Avenue, Erie, and Delaware, Lackawanna & Western Railroads. This building will be 700 x 900 ft. and will cost \$400,000.

The International Railway Co., Buffalo, has let a contract for erection of a sub-power-station, 75 x 90 ft., at North Division and Oak streets.

Plans are being prepared for an addition to be made to the plant of the Ludlum Steel Co., Watervliet, N. Y.

The H. G. Trout Iron Works Co., Buffalo, is having plans drawn for a foundry and blacksmith shop to be erected at its plant at Ohio and Mackinaw streets.

The Waterloo Mfg. Co., Waterloo, N. Y., has let the general contract for the rebuilding of its factory to cost \$50,000.

The Hammond Steel Co., Syracuse, N. Y., has awarded the contract for the erection of a transformer building, a melting scrap bin building and other buildings, at its plant on Milton Avenue.

Libby, McNeil & Libby of Chicago are building a two and three-story condensary building addition at Adams Centre, N. Y.

The Staten Island Shipbuilding Co., Richmond, Staten Island, which will build a new machine shop, blacksmith shop and boiler works at its Mariners Harbor plant, has awarded the contract to John Milnes & Co., Port Richmond, S. I.

The L. W. F. Engineering Corporation, New York, manufacturer of airplanes, has leased the plant of the Peerless Unit Ventilating Corporation, Sixth Avenue and Tenth Street, College Point, L. I., for the establishment of a works for the manufacture of aircraft.

The Fifth Avenue Coach Co., 10 East One Hundred and Second Street, New York, has completed plans for the erection of a new four-story plant at Broadway and One Hundred and Thirty-second Street for the manufacture of motor buses. R. A. Meade, president.

Thomas F. Meehan's Son & Co., Brooklyn, N. Y., operating a shipworks on Van Brunt Street, have filed articles of incorporation under the name of Thomas F. Meehan & Son, with capital of \$230,000, to engage as shipwrights, specializing in caulking, joining, ceiling and other kindred operations in connection with shipbuilding.

The Hoffer Talking Machine Co., 3 West Twenty-ninth Street, New York, has increased its capital from \$1,000,000 to \$2,000,000.

The Delmore Mfg. Co., New York, has been incorporated with a capital of \$500,000 to manufacture automobiles and accessories. E. C. Landergren, E. V. Van Voorhels and R. Henry, Jr., 165 East One Hundred and Fifth Street, are the incorporators.

The R. B. V. Motor Sales Co., New York, has been incorporated with a capital of \$5,000 to manufacture motors and engines. J. J. Brady, Jr., F. X. Riley and D. L. Brady, 1403 Grand Concourse, Bronx, are the incorporators.

Charles Ross & Son Co., 148 Classon Avenue, Brooklyn, N. Y., machinists, has had plans prepared for a new one-story shop, 50 x 85 ft., on Emerson Place, to cost about \$8,000.

The Longuemare Motor Devices Co., New York, has been incorporated with an active capital of \$25,000 to manufacture motors, carburetors and kindred products. B. Happ, P. D. Saxe and L. Mosson, 3 Broome Street, are the incorporators.

A. W. Britton and S. B. Howard, New York, have incorporated in Delaware the International Steel & Ordnance Co., with capital of \$2,000,000, to manufacture machinery, tools and brass and iron hardware.

Oscar E. Jackson of Duncan, Jackson & Duncan, 79 Wall Street, New York, has organized a shipbuilding company to build and operate a plant on Staten Island. Property has been purchased on Arthur Kill Road, Tottenville, fronting on the Staten Island Sound, for the proposed works, which will be equipped to specialize in the production of open and covered vessels of barge type.

Charles T. Stork & Co., New York, have been incorporated with a capital of \$20,000 to manufacture airplanes and motor cycles. S. Newborg, L. L. Callan and B. Bag, 2 Rector Street, are the incorporators.

The Warren-Nash Motor Corporation, New York, has been incorporated with an active capital of \$78,750 to manufacture motor vehicles of different kinds. A. F. Skinner, C. B. Warren and J. J. Jansen, Jr., 37 Wall Street, are the incorporators.

The New York, New Haven & Hartford Railroad is having plans prepared for a new one-story roundhouse, 95 x 360 ft., at New Haven, Conn.

Lincoln Krueger, Morris Grossman and Harry G. Hecht, all of New York, have incorporated in Delaware the Decalmo Machine Co., Inc., with a capital of \$100,000, to manufacture machinery.

The United Steel & Metal Corporation, New York, has been incorporated with a capital of \$100,000 to manufacture iron, steel and metal products. The incorporators are F. Viethardt, A. Heller and M. Sternberg, 906 Broadway.

The General Optical Co., 583 First Avenue, New York, has awarded a contract for the construction of a three-story brick addition, about 75 x 275 ft., at First Avenue and Washington Street, Mt. Vernon, N. Y. A. Barbaresl, 48 South Fourth Avenue, Mt. Vernon, is the contractor.

Burdick & Son, Albany, N. Y., operating a sheet metal works at Hamilton and Mosher Streets, are having plans prepared for a new four-story addition to cost \$50,000. B. W. Burdick is president.

The Tolhurst Machine Works, Sixth Avenue and Fulton Street, Troy, N. Y., manufacturer of machinery, is taking bids for the erection of a new one-story plant, about 40 x 60 ft., at Green Island, near Troy. C. H. Foster, president.

The General Electric Co., Schenectady, N. Y., will build a new one-story foundry, about 100 x 110 ft., at its Pittsfield, Mass., works. Contract has been awarded.

The Continental Can Co., Crouse Avenue, Syracuse, N. Y., will build a new three-story addition, about 55 x 250 ft., at its East Water Street plant to cost \$200,000. Frederick P. Ashman is vice-president and treasurer.

The Pullman Co., 1770 Broadway, Buffalo, has commenced the erection of a new one-story carshop, about 235 x 540 ft., at its car construction and repair works, to cost about \$175,000. The shop will be equipped for car repair work, with capacity of about 50 cars. A new power house and electrical plant, 60 x 110 ft., will also be constructed.

The Foster Specialty Corporation, Buffalo, has been incorporated with a capital of \$300,000 to manufacture hardware specialties. Kimball A. Conant, George Walter and Walter C. Lambert, 4-6-8 Eighteenth Street, Buffalo, are the incorporators.

The H. G. Trout Co., 226 Ohio Street, Buffalo, specializing in the production of iron and brass castings, will build a new addition to its foundry, about 52 x 83 ft., to cost \$14,000. A new one-story blacksmith shop, 40 x 50 ft., to cost about \$4,000, will also be erected.

The Transcontinental Motor Truck Corporation, Buffalo, has been incorporated with a capital of \$1,250,000 to manufacture automobiles and motor trucks, engines and kindred specialties. The incorporators are E. S. Stengel, R. A. Schmidt and P. J. Bloxham, all of Buffalo.

James F. Herron, Bordentown, N. J., and associates, have incorporated in Delaware the Atlas Aircraft Corporation with a capital of \$500,000, to manufacture aircrafts of various kinds. John J. Inglesby, Merchantville, N. J., and Frank Amon, Philadelphia, are also interested in the company.

The United States Naval Department has commenced the erection of a new airplane station and auxiliary buildings on the south side of Cape May Harbor, Cape May, N. J.

The American Mine & Torpedo Co., East Orange, N. J., has filed articles of incorporation with a capital of \$100,000 to manufacture mines and other munitions. Gordon Grand, Harry H. Picking and L. Matthews, all of East Orange, are the incorporators.

The American Smelting & Refining Co., Maurer, N. J., has awarded a contract for the construction of a new four-story steel pulverizing mill, 55 x 60 ft., to H. D. Best & Co., 52 Vanderbilt Avenue, New York. Headquarters of the company are at 120 Broadway, New York.

The Des Lauries Aircraft Co., Jersey City, N. J., has been incorporated with a capital of \$500,000 to manufacture aeroplanes and other aircraft. The incorporators are Harry A. Dahlen, Jersey City; DeJohn De Wary, Newark, and R. R. Kelly, Plainfield.

The Driver-Harris Co., Middlesex Street, Harrison, N. J., manufacturer of wire, will build a new one-story foundry, 75 x 200 ft., to cost \$25,000.

The Asher Mfg. Co., Willimantic, Conn., manufacturer of laundry machinery, has acquired property, about 175 x 220 ft., on Colt Street, Newark, N. J., for the erection of a new plant to cost about \$50,000.

The Coit Machine & Engineering Co., 146 Coit Street, Irvington, Newark, N. J., will build a new two-story concrete addition to its plant at 154 Coit Street, 50 x 100 ft., to cost about \$17,000.

The Simmons Pipe Bending Works, 40 Mechanic Street, Newark, N. J., manufacturer of pipe bends and coils, will build a one-story addition to its plant at Avenue D and Murray Street, 45 x 46 ft., to cost about \$3,000.

The New Devices Co., Newark, N. J., has been incorporated with a capital of \$10,000 to manufacture vacuum cleaners, etc. The incorporators are B. N. Bishop and Richard Deubich, Newark, and Louis Caper, Plainfield.

The Bayonne Steel Casting Co., Oak Street, Bayonne, N. J., has filed plans for the construction of a one-story brick addition to its foundry to cost about \$10,000.

New England

Boston, Aug. 6.

If New England machine-tool builders were dependent upon local markets for an outlet for their products, their present great activity would have ceased some time ago. While there is some plant expansion and machine replacement going on to-day, it is indeed small in volume in comparison with 12 and 18 months ago. There is a decided lull in the business of the machinery dealers and such business as they are now getting is in many instances for plants in other sections of the country.

The local factories are virtually all running to capacity and are playing a large part in equipping the country's industries that are engaged in some portion of the war supply program. Outside of Bridgeport almost nothing is heard of labor troubles and in that city recent troubles have been of short duration with the exception of a polishers' strike at the Remington Bridgeport Works. One peculiarity of the military draft is becoming more marked each day, and that is that the small shops will be affected much more seriously than the large ones. One of the largest of the metal working industries will lose not more than 300 men and may lose as few as 100. It does not expect to ask for exemption on more than 12 or 15 men, and its employment department reports a supply of candidates for employment considerably in excess of its requirements.

The New York, New Haven & Hartford Railroad Co. has had plans drawn for a machine shop addition, 40 x 70 ft., one story, at New Haven, Conn.

The Palmer Foundry & Machine Co., Palmer, Mass., has been incorporated with authorized capital stock of \$15,000. The incorporators are Michael A. Heneberry, president; William A. Scollen, Worcester, treasurer, and S. G. Nash.

The American Hardware Corporation, New Britain, Conn., is expected to begin soon the erection of a foundry to replace the buildings known as the Corbin Annex, recently destroyed by fire.

The American Mfg. Co., Meriden, Conn., has been incorporated with authorized capital of \$50,000 to manufacture metal products.

The New Haven Clock Co., New Haven, Conn., has voted to increase its capital stock from \$1000,000 to \$1,750,000.

The Globe Iron Works, Boston, has been incorporated with capital stock of \$10,000 by Otto E. Kuehl, president; Charles A. Swenson, Medford, treasurer, and H. A. Kuehl.

The William H. Haskell Mfg. Co., Pawtucket, R. I., contemplates an addition to its bolt factory.

The Sawyer Shipyard Corporation, Augusta, Me., has been incorporated with authorized capital stock of \$800,000 by I. S. Kearney, president and treasurer, and E. Maynard Thompson.

The American Cement Ship Co., Boston, has been incorporated with authorized capital stock of \$99,000. The directors are H. W. Loker, president; Warner V. Taylor, Wakefield, treasurer, and G. A. Clarke.

The Clark Brothers Bolt & Nut Co., Southington, Conn., contemplates building an addition to its plant.

The Wilcox-Crittenden Co., Middletown, Conn., has awarded a contract for a foundry, 40 x 90 ft., one story.

The Penn Seaboard Steel Corporation, New Haven, Conn., has awarded a contract for an addition to its local steel plant to cost \$25,000.

The Rockwell-Drake division of the Marlin-Rockwell Corporation, Plainville, Conn., expects to double the capacity of its plant and work on the new structures will begin at once.

The Stamford Rolling Mills Co., Stamford, Conn., has begun the erection of an addition, 60 x 70 ft., one story.

J. H. Hamlen & Son, Masonic Building, Portland, Me., have had plans drawn for a shipyard at South Portland.

The Fafnir Bearing Co., New Britain, Conn., has awarded a contract for an addition, 50 x 80 ft., one story.

The Holland Machine Co., Water Street, Norwalk, Conn., has awarded a contract for an addition, 25 x 50 ft. and 12 x 17 ft., one story.

The Magnus Co., brass founders, 248 Cedar Street, New Haven, have begun the erection of a foundry, 85 x 140 ft., one story, on Eddy Street.

The Cheney-Bigelow Wire Works, Springfield, Mass., has purchased a tract of land on Liberty Street to provide for future plant expansion. The company has no immediate plans for improvements.

The American Emery Wheel Works, 325 Waterman Street, Providence, R. I., will build an addition, 40 x 75 ft., one story.

Steel Co., Temple, Pa., will consist of a one-story malleable foundry, 136 x 288 ft.; hard iron mill, 32 x 170 ft.; soft iron mill and annealing works, 95 x 260 ft.; one-story pattern shop, 36 x 90 ft.; core house, 50 x 70 ft.; and power plant for operation, 65 x 80 ft. The structures will be brick, steel, and reinforced concrete; with equipment, the plant is estimated to cost \$500,000. Frank D. Case, People's Gas Building, Chicago, is architect.

The Clarksburg Motor Co., Clarksburg, Pa., has been incorporated with a capital of \$10,000 to manufacture motors. J. E. Ashbaugh is the principal incorporator.

The Commercial Box & Envelope Co., Chester, Pa., has acquired property at Manayunk for a new manufacturing plant, and will remove its present works to the new location. The present Chester plant has been acquired by the Chester Shipbuilding Co. for extensions to its shipbuilding plant.

The Landis Tool Co., Waynesboro, Pa., manufacturer of machine tools, is building a new one-story foundry addition, about 60 x 100 ft.

The Hamburg Foundry Co., Hamburg, Pa., has been incorporated with a capital of \$50,000 to operate a local plant. D. H. Redmond, Philadelphia, heads the company.

The Troy Engine & Machine Co., Railroad Avenue, Troy, Pa., manufacturer of stationary engines, is planning for the erection of a new one-story foundry addition to its plant, about 45 x 45 ft.

The Conestoga Motor Truck Co., Lancaster, Pa., has acquired about 15 acres of property with 1200 ft. frontage on the Pennsylvania Railroad, for the construction of a new plant.

The Craley Mfg. Co., Mt. Joy, Pa., has been incorporated with a capital of \$10,000 to manufacture tools. Jacob D. Flory, Lancaster, heads the company.

The Gross Mfg. Co., West Hazleton, Pa., operating machine repair shops, has commenced the erection of a new pattern shop. The company will also enlarge its foundry.

The Reading Steel Casting Co., Reading, Pa., will build a new foundry and make extensions at its plant to cost about \$100,000. A new 10-ton open-hearth steel furnace will be installed. The company has recently received an order from the Government for mountings for four-inch aircraft guns.

The Keystone Machine Co., York, Pa., has been incorporated with a capital of \$5,000 to operate a local plant. M. S. Niles is the principal incorporator.

Philadelphia

PHILADELPHIA, Aug. 6.

The Lanston Monotype Machine Co., Twenty-fourth and Locust Streets, Philadelphia, will build a new 5-story and basement brick and concrete plant addition, about 50 x 125 ft. William Steele & Sons Co., 34 South Fifteenth Street, has the contract.

S. A. Ashman & Son Co., 2300 East Tioga Street, Philadelphia, manufacturer of iron and steel forgings, has filed plans for the erection of a shop addition.

The Machine Composition Co., Philadelphia, has been incorporated with a capital of \$18,000 to manufacture type. E. F. Banes is the principal incorporator.

The Pennsylvania Railroad Co., Broad Street Station, Philadelphia, will build a new one-story shop building, 50 x 90 ft., at its Girard Point works. The company is also taking bids up to Aug. 14 for the construction of a new one-story concrete power house, 30 x 50 ft., at Girard Point.

The Electric Service Supplies Co., Seventeenth and Cambria Streets, Philadelphia, manufacturer of electrical specialties, has awarded a contract for the erection of a three-story brick and concrete plant addition. John L. Gill & Co., Otis Building, are the contractors.

The All-Steel Wheel Co., Philadelphia, has been incorporated in Delaware with a capital of \$200,000 to manufacture steel wheels. F. R. Hansell, Philadelphia; J. Vernon Pimm and S. C. Seymour, Camden, N. J., are the incorporators.

The Richter Machine Co., Philadelphia, will build an addition to its shop in the Wissinoming section.

The E. B. Friel Co., Philadelphia, has been incorporated with a capital of \$5,000 to manufacture metal lathing and kindred specialties. H. K. Armstrong is the principal incorporator.

The Trenton Malleable Iron Co., New York Avenue, Trenton, N. J., is having plans prepared for a new two-story pattern shop, about 28 x 130 ft. R. A. Schumann, 332 Lamberton Street, is architect.

The proposed new plant of the Temple Malleable Iron &

Baltimore

BALTIMORE, Aug. 6.

Land for shipbuilding sites is still being sought in this section. It is understood that the Chesapeake Shipbuilding Co., Inc., which was incorporated here recently by Cleveland interests, is planning to take over a large tract of land in the vicinity of Curtis Bay, Md., where a large number of plants are located. It also is understood that the plant when constructed will turn out vessels for the Government. The tract is of about 75 acres. The Chesapeake Shipbuilding Co. was incorporated with \$100,000 capital by Sheldon H. Tolle, Kernold Gill, James H. Foster and Roger C. Hyatt, all of Cleveland.

The Consolidated Power Co. of Baltimore, York Road near Chesapeake Avenue, Towson, Md., has been incorporated with \$1,300,000 capital stock to carry on electric light, power and gas light business. The incorporators are Herbert A. Wagner, Charles M. Cohn and William Schmidt, Jr., all of the Consolidated Gas, Electric Light & Power Co., Baltimore.

The Lincoln Brass Foundry Co., Fifth and Jeffrey streets, Chester, Pa., a new industry, is ready for operation. The new building has been fully equipped. The company is headed by J. A. Worrell, Chester, and W. Frank Mathues, Media, Pa.

The Baltimore Gas Appliance & Mfg. Co., Bayard and Hamburg Streets, Baltimore, Md., is taking bids for the construction of a new one-story foundry, 137 x 370 ft., to cost about \$50,000.

The Consolidated Gas, Electric Light & Power Co., Baltimore, Md., is planning for the erection of a new electric power station, with initial capacity of about 50,000 h.p. It is expected to have the plant in operation in about 18 months.

The Maryland Meter Works, Baltimore, Md., will build a new six-story plant, about 50 x 90 ft., at Holliday and Saratoga streets, to cost \$30,000. Deverill Spencer, Garrett Building, is the contractor.

Henry Smith & Sons Co., German and Light Streets, Baltimore, Md., has acquired property consisting of about 10

aerons on Curtis Creek, and plans for the construction of a shipbuilding plant.

The National Tractor Co., Georgetown, Del., has been incorporated with a capital of \$2,500,000, to manufacture tractors and tractor parts. The incorporators are Woodburn Martin, Charles W. Cullen and Albert Worth, all of Georgetown.

The Bureau of Yards and Docks, Washington, D. C., will build a new one and two-story repair shop addition to the naval observatory, about 40 x 50 ft., to cost about \$20,000.

The American Shipbuilding & Dock Corporation, Beaufort, S. C., recently incorporated with a capital of \$320,000, has acquired a site on the Beaufort River, near Beaufort, and plans for the erection of a shipbuilding plant, including machine, riveting, and erecting shops. Two shipbuilding berths will be constructed, each about 350 ft. R. C. Horne, Jr., and W. E. Richardson, both of Beaufort, are president and treasurer, respectively.

Howard Bruce, president of the Bartlett-Hayward Co., Baltimore, has denied the press statement that his company has a large contract for the manufacture of guns for the Government. It has been reported that if the company takes such a contract it will build a large plant in the vicinity of its munitions operations at Turner's Station, Md.

The Maryland Metals Spraying & Welding Co., 2620 North Charles Street, Baltimore, has been incorporated with \$75,000 capital stock to deal in metal coating machines, welding machines and other machinery. The incorporators are William R. Seth, Thomas Benson and Jacob H. Nicholson.

Pittsburgh

PITTSBURGH, Aug. 6.

Machinery builders and dealers in this district continue to report conditions as quiet. There has been a general halt in the buying of new tools, and in some cases plans that were under way for extensions to existing plants have been put aside until the situation as to the future clears up. No new machine lists have come out in the past week. Machine tool builders here do not look for any material decline in prices. They point out that they are filled up with orders for a year to 18 months on nearly all kinds, and the army draft is going to take hundreds of men now employed in machine building shops, though to some extent the men will have to be replaced by female labor.

The scarcity of skilled mechanics is interfering seriously with the completion of tools on shop floors. The Westinghouse interests are especially short of men at all of their shops, and are advertising for men in the daily papers in nearly all of the large cities.

The Pennsylvania Lines West (Panhandle Route) have made an appropriation for the building of new machine, tank and boiler shops at Columbus, Ohio, and a large quantity of new machinery and tools will be needed, for which the lists are expected soon.

Within a short time it is expected the Pittsburgh Steel Products Co., Frick Annex, Pittsburgh, which is making plans for building a large seamless tube mill plant at Allentown, opposite Fayette City, Pa., will be in the market for an extensive line of equipment. This will consist of cranes, shears and seamless tube mill machinery.

The Keystone Pipe & Supply Co., 237 East Cunningham Street, Butler, Pa., manufacturer of oil well supplies, is planning for the installation of a new four-inch pipe machine, steam engine, air compressor, and other equipment.

The McKeesport Enameling Co., McKeesport, Pa., has been incorporated in Delaware with a capital of \$50,000. James W. Nesbitt, A. Clifford Wiltshire and J. R. Woreley, all of McKeesport, are the incorporators.

The Pittsburgh Mining Machine Co., Pittsburgh, has been incorporated with a capital of \$100,000 to manufacture mining machinery. T. H. Edelblute is the principal incorporator.

The Aluminum Co. of America, Pittsburgh, will build a new hydroelectric power plant at Badin, N. C. The initial installation will consist of three 10,000 horsepower generating units and auxiliary equipment.

Chicago

CHICAGO, Aug. 6.

Business which owes its inception to Government action is making itself felt in the Chicago territory. Most of the activity is in tools required in the manufacture of guns and tractors, large orders for both having been placed with Western firms. The Wisconsin Gun Co., Milwaukee, continues to buy, and orders are being placed also by the Northwestern Ordnance Co., Madison, Wis. As reported heretofore two truck companies have placed substantial orders, also a company manufacturing motors for tractors.

In Minneapolis and St. Paul there is considerable activity. The Toro Motor Co., St. Paul, has sold equipment and manufacturing rights to the Whitman Agricultural Co., St. Louis. The latter company also has purchased the Bull Tractor Co., Minneapolis, and will erect a factory at St. Louis, Mo., for the manufacture of tractors. The Toro Motor Co. will equip a new shop at Minneapolis, and continue the manufacture of motors. The Twin City Four Wheel Co., Minneapolis, Minn., tractor makers, is buying also.

The Buda Co., Harvey, Ill., is about to close on a number of tools. No recent shell business is reported, but the general run of small orders is keeping up in a satisfactory way. Building operations in Chicago continue at low ebb. In July, permits were taken out for 321 buildings, involving a total cost of \$4,104,100, as against 844 buildings, representing \$8,076,800 for the corresponding month a year ago.

Ottenheimer, Stern & Reichert, 220 South State Street, Chicago, architects and engineers, have let several contracts for the construction of a five-story factory, 60 x 150 ft., for the Monarch Leather Co., Division and North Branch streets. The cost is estimated at \$150,000.

The general contract for a two-story tannery, 130 x 166 ft., 1257 and 1265 Elston Avenue, Chicago, for the Chicago Rawhide Co., has been awarded to F. H. Pitkin, 30 North Michigan Avenue. The structure will cost \$20,000.

The American Sugar Refining Co. and the National Biscuit Co. have purchased 145,003 sq. ft. of land in the southwestern part of Chicago, on which they will eventually build large warehouses.

Libby, McNeil & Libby, packers, have purchased 22 acres in Western Avenue, at the intersection of the Baltimore & Ohio Railroad, on which they will construct a six-story reinforced concrete building to cost \$500,000.

The King & Hamilton Co., Ottawa, Ill., maker of agricultural implements, has added to its plant a building 60 x 160 ft., to be used as a forge and sheet metal shop.

The Cable Lumber Co., Chicago, has leased land at Western Avenue and Kinzie Street, 185 x 267 ft., on which it will erect a planing mill and other buildings.

Work has been begun at Peoria, Ill., on repair shops for the P. & P. U. Railway.

The Carnation Milk Co., which operates a large condensing plant near Oconomowoc, Wis., is contemplating the erection of a can factory, 120 x 150 ft., to cost about \$250,000.

The Simple Gas Engine Co. has been organized at Menasha, Wis., with a capital stock of \$10,000 to manufacture gas engines. John G. Walter is president. The company was formerly located at Superior.

The Morton Mfg. Co., Muskegon Heights, Mich., is contemplating the addition of a foundry to its plant. It recently completed a four-story addition to its shops. The company has begun negotiations for land on which to erect the foundry, the cost of which is estimated at \$100,000.

The Michigan Hearse & Motor Co., Grand Rapids, Mich., has bought land to provide for an addition to its factory, which will double its output. The company manufactures army ambulances in addition to other types.

The J. Knappe Machinery Co., Grand Rapids, Mich., has begun the building of a one-story plant addition, 30 x 74 ft., to cost about \$2,500.

The Olds Motor Works, Lansing, Mich., is adding to its large plant a two-story structure, 80 x 400 ft. The lower floor will be used for the storage of materials, and the upper for the inspection and care of new cars.

The Peru Foundry Co., Peru, Ind., has been incorporated with a capital stock of \$60,000, to do a general foundry business. Among the directors are M. F. Gartland, J. H. Schaumleffel and John C. Haswell.

The Moline Forging & Mfg. Co., Moline, Ill., will build a new one-story forge shop, about 110 x 265 ft., to cost \$75,000. H. Ainsworth is president.

Milwaukee

MILWAUKEE, Wis., Aug. 6.

High-pressure conditions continue to be further accentuated by an ever-increasing number of orders from a wide variety of sources, and shops are getting further and further behind on deliveries, which now are eight to nine months forward. The bulk of the new business comes from metal-working shops which are working on Government business and these requirements are being given preference according to the degree of urgency of each case in its relation to the scheme of national defense. A feature of the past week's activities is the large number of new corporations organized to engage in one or another field of the metal-working industry. New organization slackened at the beginning of the war to an appreciable extent, but a sharp revival has now set in.

Another large ordnance manufacturer, the Northwestern

Ordinance Co. of Madison, in which the Gisholt Machine Co. is largely interested, has entered the field at the request of the Government, making two shops in Wisconsin devoted exclusively to the production of field pieces, the Wisconsin Gun Co., Milwaukee, having been previously noted. They have been responsible for two lots of comparatively large size placed with tool-builders in recent days. Business in prime movers also shows a revival, the past week's bookings including a 1500 kw. installation by the Allis-Chalmers interests. The intense heat during the past week reduced production to some extent throughout the industry in Wisconsin. For humanitarian reasons nearly all plants closed on two or three afternoons. Contrary to the popular idea, it is stated that the stringency in the labor situation is not pressing, although the men who are available demand places on day forces, making it somewhat difficult to keep night forces up to the desired quota.

The Wisconsin Engine & Dynamo Co., Milwaukee, has been incorporated with a capital stock of \$200,000 to establish a plant for the manufacture of electrical machinery and equipment. The moving spirit in the project is John I. Beggs, Milwaukee, a large owner of public utilities in Wisconsin and elsewhere. Win H. Cameron and Chester B. Pierce are associated with Mr. Beggs. While no definite announcement has been made relative to the plans of the new concern, it is understood that a plant will be leased or erected in Milwaukee or suburbs, and the equipment is now being contracted for. Offices have been opened in the First National Bank Building, Milwaukee.

The L. J. Mueller Furnace Co., 197 Reed Street, Milwaukee, maker of hot air, hot water and steam heating plants, has taken a contract to furnish hot air heaters to the Government for the equipment of the various cantonments for the new national army. The contract calls for about 1000 units and is valued at \$100,000.

The Ton-A-Ford-Trux Co., Racine, Wis., has been organized by Fred and Louis Boldig, Herman R. Swanke and George Beardsley to engage in the manufacture of commercial car attachments to Ford chassis. The capital stock is \$200,000.

The Lawson Aircraft Corporation, Green Bay, Wis., has been incorporated with a capital stock of \$200,000 to take over the airplane manufacturing business established recently in that city by the Lawson Aircraft Co., capital stock \$50,000. Alfred Lawson, formerly of Detroit, is general manager of the plant, which occupies a number of buildings of the former American Woodworking Machinery Co., Green Bay. John Carisi, formerly of Brooklyn, N. Y., is factory superintendent and Lawrence Allison is chief engineer. Green Bay capital is financing the project.

The American Auto Body Co., Milwaukee, has been incorporated with a capital stock of \$40,000 to manufacture passenger and commercial automobile bodies. The incorporators are David J. Borun, L. L. Gridley and Henry E. Bradley.

The Milwaukee Heat Treating Co., 651-653 South Pierce Street, Milwaukee, has changed its corporate style to Wesley Steel Treating Co. The company operates a large plant devoted to carbonizing, case-hardening, tempering and annealing processes. Charles Wesley is general manager.

The Green Bay & Eastern Railway Co., Manitowoc, Wis., organized a year ago with \$50,000 capital, has been authorized by the Railroad Commission of Wisconsin to increase its capital stock to \$3,000,000. The company will build a line from Manitowoc to Green Bay, Wis., and from Manitowoc to Sheboygan, Wis. W. M. Willinger is president and Rudolph Stockinger is secretary.

Stanley, Wis., business men are negotiating with the promoters of a foundry and furnace manufacturing company, the name of which is not divulged, with a view to locating its plant in that city. The company purposes to manufacture heating devices capable of utilizing low-grade western lignite coal. J. B. Halverson is representing Stanley business men.

The New Way Machine Co., Eau Claire, Wis., organized recently with a capital stock of \$60,000 by Ernest Wege, A. J. Hintz and O. A. King, will engage in the manufacture of farm tillage tools and machinery.

The Simple Gas Engine Co., Menasha, Wis., has completed the removal of its shop from Ashland, Wis., to Menasha, and resumed operations in the former plant of the Menasha Coöperage Co. The new officers are: President, John Walter; vice-president and superintendent, A. L. Priemesberger; secretary-treasurer, John Hrubecy; general manager, F. J. Oberweiser.

The Wisconsin Interurban Co., Madison, Wis., organized several years ago to build an electric railroad system of 250 miles, radiating from Madison, has filed a trust deed of \$9,000,000, with the Chicago Title & Trust Co., Chicago, as trustee, and will resume work immediately. The Railroad Commission has authorized the first installment of bonds, amounting to \$600,000. The general contract for the construction of the road has been awarded to John T. Adams, Columbus, Ohio.

The Oshkosh Foundry Co., Oshkosh, Wjs., which has been incorporated with \$10,000 capital, is the formal organization of the commercial foundry business established in a plant on Marion Street, Oshkosh, within the last three months by Joseph W. Radl, Frank T. Turner and Hugo M. Steuck.

The Racine Motor Truck Co., Racine, Wis., organized about four months ago to build commercial vehicles, and now occupying temporary quarters at 1109 Sixth Street, is contemplating the erection of a complete new plant during the coming year. It will then also engage in the manufacture of internal spur gear drive axles on a commercial basis. Charles H. Piggins is vice-president and chief engineer.

The Wisconsin Valley Electric Co., Wausau, Wis., has contracted with the Allis-Chalmers Mfg. Co., Milwaukee, for the erection and equipment of a new auxiliary steam generating plant of 1500 kw. capacity, estimated to cost between \$90,000 and \$100,000. The plant will include a steam turbine, Heine boilers and Westinghouse automatic stokers. Delivery will be made during September.

The Goodrich Transit Co., Chicago, has accepted the offer of the Chamber of Commerce, Manitowoc, Wis., of four lots on the Manitowoc River in the inner harbor for its proposed new repair yard and winter quarters, made necessary by the fact that its present quarters are required by the Manitowoc Shipbuilding Co. to handle Government business. W. A. Cochrane is superintendent.

Detroit

DETROIT, Aug. 6.

The machine tool market continues to show improvement, due to excellent business conditions and the large number of firms recently incorporated to enter the manufacturing field. Several good sized orders were placed last week and numerous inquiries are being received. Deliveries on standard machines remain very slow and on special machines quotations are made for 1918.

Labor conditions in the district are excellent and wages high. The trouble with the miners in the northern part of the State has practically been settled, as the backbone of the strike for higher wages has been broken after the expelling of I. W. W. agitators.

The greatest difficulty is obtaining prompt delivery of steel and copper, which is handicapping the automobile concerns and accessory plants. Transportation facilities have been greatly improved during the last several weeks and deliveries are expected more regularly.

The Packard Motor Car Co., Detroit, has received an order for 3000 3-ton chainless trucks. This is the second quantity order placed by the Government with the Packard within the last two weeks, and brings the total up to 4800 trucks, representing a money value of more than \$16,000,000.

During the fiscal year of the Ford Motor Co., Detroit, ended July 31, 735,000 automobiles were produced. Orders at present are 80,000 in excess of production. Last year's production was 200,000 more than the previous year at the Detroit plant and 50,000 more at the branch plants. During the month of May, 1917, 83,706 cars were completed.

The Great Lakes Engineering Co., Detroit, is being considered by the Government as a producing plant for its boats.

The Pioneer Trailer Corporation, Detroit, has been organized with a capital of \$30,000.

The Triangle Truck Co., St. Johns, Mich., will have its new plant in operation about Nov. 1. The concern, which was recently organized, will make 1½-ton vehicles.

The One Wheel Truck Co., St. Louis, Mich., has recently been incorporated to build a tractor with one wheel in the center surrounded by a platform for the motor and driver's seat.

The Saxon Motor Car Corporation, Detroit, has taken a lease on the plant formerly occupied by the Abbott Motor Corporation. The plant has 60,000 sq. ft. of floor space.

The Fisher Body Corporation, Detroit, is reported to have received an order for airplane bodies amounting to more than \$5,000,000.

The Young High Velocity Carburetor Co. has engaged in business at 1211-15 Woodward Avenue, Detroit, to manufacture high velocity carburetors. The authorized capital is \$250,000, all of which has been paid in in cash.

The Chicago Stove & Range Co. will erect a factory at Benton Harbor, Mich.

The William E. Hill Co., Kalamazoo, Mich., manufacturer of machinery, castings and similar products, has re-incorporated with a capital stock of \$150,000, all of which has been paid in.

The Mott Wheel Works, Jackson, Mich., an enterprise recently obtained by that city, is installing machinery, stock and other equipment in its new plant.

The Saginaw Shipbuilding Co., Saginaw, Mich., has filed articles of incorporation with a capital stock of \$350,000.

The Wilson Body Co., Bay City, Mich., has completed its new plant and is ready for the installation of machinery. The main plant has a floor space of 90,000 sq. ft. and with smaller buildings totals 114,500 sq. ft.

The Bay City Auto Body Co., Bay City, Mich., formerly the Kelly Body Co., has moved from the west side to the east side and is rapidly expanding its business.

The Harrah Wire Cloth Co., Niles, Mich., plans an addition to its factory. W. F. Harrah is president.

The Michigan Chandelier Co., Detroit, has been incorporated with a capital stock of \$50,000 by Nathan and Regina Silberstein and S. Groosfoeld.

The Manistique Pulp & Paper Co., Manistique, Mich., has been incorporated with capital stock of \$500,000.

Announcement is made of the formation of the Ecorse Foundry & Machine Co., Ecorse, Mich., which is completing a new plant. The company will manufacture gray iron castings and sufficient equipment is being installed to melt 100 tons per day. B. F. Everitt is president and A. J. Kinnucan is treasurer and general manager.

The Lake Shore Engine Works, Marquette, Mich., has increased its capital stock from \$200,000 to \$350,000.

The Hayes Motor Truck Wheel Co., St. Johns, Mich., has increased its capital stock from \$100,000 to \$500,000.

The Underhood Motor Heater Corporation, Detroit, has been incorporated by Stephen Kaladzie, Samuel V. Kowrack and James B. Giern. Capital stock, \$65,000.

The Victor Wire Wheel Co., Kalamazoo, Mich., has been incorporated for \$500,000.

The Duplex Truck Co. is rushing work on the construction of its new plant at Lansing, Mich. It is expected the plant will be in operation Dec. 30. H. M. Lee is president.

The Tower Motor Truck Co., Greenville, Mich., has increased its capital stock from \$50,000 to \$100,000.

Cleveland

CLEVELAND, Aug. 7.

Machine tool builders are getting a good volume of orders for machines for Government work, largely in connection with airplanes and shells. The Forest City Machine & Forge Co., Cleveland, has taken a large Government order for detonators, and has purchased 30 screw machines. Orders for a number of machines for airplane work were placed during the week by Henry Leland, Detroit. The shortage of labor in machine shops is having an effect on the market, some plant managers announcing that they would like to purchase additional equipment were they able to secure men to operate it. A number of factory additions designed for war work or for increasing the capacity in lines stimulated by the war are under way or being planned in this territory, and this will require considerable additional machinery equipment. Trade has quieted down somewhat with local machinery dealers. Scattered small lot sales are reported, but outside of machinery requirements for Government work the market is quiet.

The Cleveland Tractor Co., Cleveland, will enlarge its plant by the erection of a one-story factory addition, 60 x 477 ft., and a hardening room, 80 x 90 ft. Plans are being prepared by George S. Rider & Co., engineers, Cleveland.

The Federal Nut, Bolt & Machine Co., Cleveland, has recently been organized and has a new plant nearly ready for operation on Collamer Avenue, near the Nickel Plate Railroad. The new building is one story, 40 x 120 ft. The company is composed of the same interests that control the Cuyahoga Stamping & Machine Co., and has taken over the screw machine products department of that company. H. A. Tremaine is president.

The Parish & Bingham Co., Cleveland, maker of automobile frames and other sheet metal parts, is planning the erection of a machine shop addition, 150 x 200 ft., with a saw-tooth roof. Bids have been taken by Ernest McGeorge, engineer, Leader-News Building.

The H. J. Walker Co., Cleveland, has under construction a \$30,000 plant addition to be used for machine shop purposes.

The Austin Co., Cleveland, has taken a contract for two factory buildings for the Dayton Metal Products Co., Dayton, Ohio. One will be 60 x 115 ft. and the other 100 x 360 ft.

The Crowell-Lundoff-Little Co., Cleveland, has taken the general contract for a large plant addition to be erected for the T. H. Symington Co., Rochester, N. Y. This will be a

one-story structure, 225 x 700 ft., and will be used in the manufacture of 3-in. guns. The structural steel contract has been placed with the King Bridge Co., Cleveland. It will require 800 tons of structural steel.

The Lang Auto Body Co., Cleveland, has acquired a 5-acre site on Lorain Avenue, on which it plans the erection of a large plant for the manufacture of bodies for motor trucks and pleasure cars. Plans are being prepared by Paul Schmitt. Charles E. J. Lang of the Baker R. & L. Co., is president, and Elmer Lang is vice-president and general manager.

The Union Tool Co., Cleveland, has been incorporated with a capital stock of \$100,000 by S. L. Drake, G. I. Gardner, A. E. Gillard and others.

The Aultman-Taylor Co., Mansfield, Ohio, will enlarge its plant by the erection of a two-story machine shop addition to provide greater capacity for the manufacture of gas tractors.

The Kenney-McGreevy Foundry Co., Mansfield, Ohio, has been incorporated with a capital stock of \$20,000 by W. D. Kenney, Hugh McGreevy and others.

The Jaxon Co., Toledo, Ohio, has been incorporated with a capital stock of \$10,000 by Frederick E. LaFrance, G. E. Smith, Frank L. Lucas and others to manufacture tools and dies.

Indianapolis

INDIANAPOLIS, IND., Aug. 6.

The Commercial Club of Richmond, Ind., announces that the Jenkins Vulcan Spring Co. of St. Louis will move its plant to Richmond. The company is to be reorganized with \$300,000 capital stock.

The Spearhead Lawnmower Co. has been organized at Indianapolis and incorporated with \$50,000 capital stock, to manufacture machines and tools. The directors are J. E. Harting, J. H. Pearson and C. E. Phillips.

The Coldstream Corporation has been incorporated at Evansville, Ind., with \$60,000 capital stock, to manufacture apparatus for cooling water. The directors are William Scherffus, Jr., William J. Mann and Hayward Flickner.

The Red-Devil-Speed Hammer Co. has been incorporated at Gary, Ind., with \$50,000 capital stock, to manufacture machinery. The directors are Julius Cayo, Samuel Mitchell, George P. Rose, Don Van Lieu and P. T. Burke.

The Parsons & Posey Construction Co. has been incorporated at Evansville, Ind., with \$10,000 capital stock, to construct railroads, highways, etc. The directors are Charles H. Parsons, George M. Posey and Phelps F. Darby.

Craig-Hunt, Inc., has been incorporated at Indianapolis, with \$10,000 capital stock, to manufacture automobiles. The directors are John R. Craig, Wilbert L. Hunt and William C. McNabb.

The Juniata Sweeper Mfg. Co. has been incorporated at Indianapolis, with \$25,000 capital stock, to manufacture street sweeping and cleaning equipment. The directors are Martin P. Brumbaugh, Clayton A. McKinney, Juniata, Pa.; Daniel S. Brumbaugh, Altoona, Pa.

Cincinnati

CINCINNATI, Aug. 6.

Munition makers and shipbuilding firms have lately bought a number of large lathes, planing machines and boring mills. Small lathes now seem to be the only kind of machine tools that are not in demand, but orders already in hand enable different firms to keep running on full time. A very encouraging feature of the present situation is the comparative absence of any labor troubles. The bonus systems adopted by different local firms seem to operate successfully and both skilled and unskilled labor is now earning more than at any previous time. The labor situation at Hamilton, Ohio, as far as the foundries are concerned, changes almost daily. The latest reports show the resumption of work at all except two foundries. There is no likelihood of the present strike there being extended to include the machinists.

The Cisco Machine Tool Co., Cincinnati, has awarded contract to Wm. Lang & Sons Co. for a large addition to its plant at Southside. The equipment to be installed will be mostly of the company's own manufacture.

Work on the new plant of the Champion Tool Works Co., Cincinnati, has progressed so rapidly that the company expects to have it in full operation early in the fall season.

The Dayton Handle Co., Dayton, Ohio, has secured permit for the erection of a two-story brick and concrete plant estimated to cost \$14,000. Work will commence at an early date.

The Superior Tool Co., Dayton, Ohio, has been incorporated with \$10,000 capital stock, and has taken over the business of the Progressive Tool & Die Co. W. H. Williams is president and W. E. Watson secretary and treasurer.

J. A. Poss, contractor, Springfield, Ohio, has been awarded contract for remodeling a building at Urbana, Ohio, that will be the new home of the American Tool & Mfg. Co. of that city.

The city of Springfield, Ohio, is in the market for an 18-in. x 10-ft. engine lathe. Bids will be opened Aug. 14. Charles E. Ashburner is city manager.

The Troy Wagon Works Co., Troy, Ohio, is contemplating making an addition to its plant. The company recently received a large order from the French Government for automobile and auto-truck trailers.

The municipality of Lucasville, Ohio, will establish an electric lighting plant. Alonzo Purdy heads a committee appointed to purchase the necessary machinery.

Additional details received confirm the report that the Elgin Tractor Co., Elgin, Ill., will remove its plant to Piqua, Ohio. Work has already commenced in remodeling a building to house the plant.

The Remy Electric Co., Anderson, Ind., has broken ground for a three-story addition to its plant, of concrete and steel construction.

The Central South

LOUISVILLE, Ky., Aug. 6.

Inquiries for motors of various sizes have been a feature of the week in this market, high prices of coal and uncertainty of supplies favoring changing of factories to electric drive. Occasional inquiries for ice-making machinery and cold storage plant equipment are beginning to be received. High prices are tending to discourage buying in most lines and the most active demands are those from the coal and oil development interests. The Louisville Industrial Foundation is negotiating with several prospects who consider locating a malleable iron foundry in Louisville.

The Southern Machinery Exchange, Somerset, Ky., is in the market for a s. h. oil well drilling machine; one self-contained, side-crank steam engine, 40 to 60-hp., and manual training equipment consisting of one surfer, one College lathe, three smaller lathes and a 5 hp. a. c. motor, 220-volt.

The John G. Duncan Co., Knoxville, Tenn., has issued the following inquiries: Jobbers' prices, for immediate delivery, on a second-hand circular or band resaw, to saw boards 12 in. wide, in first-class running condition; self-feed gang rip saw to rip veneers $\frac{1}{4}$ in. thick and 1 in. wide, with capacity for eight such strips or wider; jobbers' prices on first-class-second-hand broom handle lathe, paint and polishing machine, and combination mattress packer for quick delivery; dealers' prices on a complete crushing and pulverizer outfit for turning out 75 to 100 tons of agricultural limestone in 10 hours.

California

LOS ANGELES, July 31.

The Riverside Aircraft Co., Riverside, Cal., recently incorporated, has been granted permission by the State commissioner to issue stock for \$50,000 to provide for the installation of a plant for the manufacture of airplanes and other aircraft. The company has acquired the former Miller planing mill on Fifth Street for its initial works. R. C. Bowman and E. T. Ford head the company.

The Forscher Dual Frame Truck Co., Los Angeles, has been incorporated with a capital of \$100,000 to manufacture trucks of special type. J. F. Manning, H. W. Wyatt and L. W. Van Dyke, all of Los Angeles, are the incorporators.

The Board of Supervisors, Los Angeles, is having plans prepared for a new one-story, reinforced-concrete power plant, 80 x 100 ft., to be erected at the county hospital. William Davidson, chief mechanical engineer, Hall of Records, is in charge.

The Lilly-Fletcher Co., Los Angeles, has filed application with the City Harbor Commission for a lease of property consisting of about five acres on the Wilmington Basin, Los Angeles Harbor, for the construction of a shipbuilding works.

The National Pump Co., Los Angeles, has been incorporated with a capital of \$100,000 to manufacture pumping machinery. G. A. Howk, Los Angeles, F. M. and J. H. Townsend, San Gabriel, and A. J. Gutzler, South Pasadena, are the incorporators.

The A. J. Savage Munitions Co., San Diego, Cal., is arranging for a site on Broadway, including tideland property, for the erection of its proposed firearms manufacturing

plant. The initial structures will consist of two one-story buildings, each about 60 x 300 ft., with woodworking plant, to cost about \$45,000; the machinery and equipment is estimated to cost \$225,000, including the electric operation of the plant in all departments. The company will specialize in the manufacture of sporting rifles, repeating shotguns, automatic pistols and a new automatic machine gun. About 250 hands will be employed.

The Merchants Marine Construction Co., Los Angeles, has acquired property consisting of about 10 acres on the main channel of Long Beach inner harbor, Long Beach, and plans for the construction of a new shipbuilding plant to cost about \$500,000.

The Satisfaction Heating Co., Los Angeles, has been incorporated with a capital of \$10,000 to manufacture heating specialties. Charles D. Wharton and S. M. Campbell, Los Angeles, and Wilson H. Teale, Pasadena, are the incorporators.

The Southern Pacific Railroad Co., Los Angeles, is planning for the construction of a new roundhouse at Fresno, Cal., as an addition to its present shop, to provide for an increased capacity of 30 locomotives.

The Seventh Street Co., Union Oil Building, Los Angeles has had plans prepared for a reinforced-concrete power plant, about 40 x 90 ft., to be erected in the rear of 715 Olive Street, at a cost of about \$14,000.

San Francisco

SAN FRANCISCO, July 31.

The establishment of new shipyards on San Francisco Bay, the enlargement of others, and expansion of manufacturing plants of various kinds, have stimulated the machinery market in this territory to an unusual degree. All lines of machine tools, both heavy and light, are moving easily under pressure of the insistent demand from industrial plants. Many large orders for heavy machinery have been placed by shipyards, both those in existence and in course of construction. There is a very active demand for sugar mill machinery, especially, from the beet sugar mills. Electric transmission machinery commands the special attention of local factories and Eastern representatives. Exploitation of new mines and the reopening of old ones calls for the heavier lines of machinery equipment. Lack of material is the most serious problem that machinery houses, on this side of the country, have to contend with.

Construction work is under way on the Hetch Hetchy project for supplying San Francisco with pure water. Attempts to secure bids on three locomotives for a connecting railroad, with a six-months delivery, failed.

The Byron Jackson Iron Works, West Berkeley, Cal., is adding another machine shop, 275 x 100 ft. The total cost, including equipment, will approximate \$100,000.

A fire protection plant is being installed at the Stockton (Cal.) works of the Holt Mfg. Co., at a cost of \$50,000. The system is dominated by a tower supporting a tank containing 100,000 gal. of water, the base of which is 125 ft. from the ground. Although the factory is within the Stockton city limits an independent pipe system has been installed.

The Fay Shipbuilding Co., Eureka, Cal., will at once erect shops and other buildings on the site of its proposed shipyard.

The extensions to the machine shop at the United States Navy Yard, Mare Island, Cal., include a 40-ton and a 10-ton crane.

The Llewellyn Iron Works, Los Angeles, Cal., has applied for a lease on waterfront property on which to erect works for manufacturing and assembling boilers, tanks, engines, etc., for outfitting ships.

The San Diego & Arizona Railroad Co., San Diego, Cal., will erect a 4-stall engine house costing \$27,000. Considerable trackage and the installation of machinery will be involved.

The Tracy Shipbuilding Co., National City, Cal., has renewed its option on bay front property.

The Savage Corporation has applied for a lease on tide lands at San Diego, Cal., on which to erect two factory buildings and a wood-working shop. The cost of the buildings is placed at \$45,000 and of the equipment at \$225,000.

The Riverside Aircraft Co., Riverside, Cal., has taken over the Miller planing mill at that place and announces plans to enlarge the plant and install new machinery.

The California-Hawaiian Sugar Co., Crockett, Cal., has let contracts for extensive additions to its sugar refining plant to cost, according to report, approximately a million and a half dollars.

The Union Construction Co., Oakland, Cal., has secured a lease of a 25-acre shipbuilding site on the Oakland waterfront.

J. M. Stanley, Oakland, Cal., has completed plans for a one-story brick shop building to be erected at the Hollywood shipyards, Canal Street.

The Consolidated Mfg. Co., Oakland, Cal., has bought the plant of the East Bay Foundry Co. and will enlarge the works and add new equipment. General offices are at 512 Syndicate Building.

The San Francisco Shipbuilding Co. of San Francisco has been incorporated with a capital stock of \$500,000 to engage in the shipbuilding business. Subscribers and directors are John Lawson, George U. Hind, John H. Baxter, M. E. Harrison and W. L. Comyn.

A large administration building, a roundhouse and a machine shop, 100 x 200 ft., in dimensions are to be erected immediately for the Nevada-California Oregon Railroad at Alturas, Cal., at a cost of \$100,000.

The Barnes & Tibbets Shipbuilding Co. is expending \$40,000 in piling and preparing the ground at its Alameda site, preparatory to erecting buildings for its shipyard.

The Commercial Iron Works has entered the field in San Francisco, at 497 Fifth Street, intending to specialize in box mailing machinery.

At a directors' meeting of the Loughhead Aircraft Mfg. Co. at Santa Barbara, Cal., the following officers were elected: B. R. Rodman, president; Allan H. Loughhead, vice-president; Malcolm Loughhead, secretary, and Alfred Edwards, treasurer.

Contracts have been let for the construction of a number of concrete buildings costing \$50,000 for the Pacific Electric Metals Co. at Bay Point, Cal.

The Pacific Scale & Show Case Co., Spokane, Wash., states that the report that it had sold its plant to C. J. Reed of that city is entirely without foundation.

The Pacific Northwest

SEATTLE, July 31.

The strike that has tied up the greater part of the lumber mills and logging camps in the State of Washington seems to be no nearer settlement than for several weeks past, despite the efforts of both sides, and the work of Federal officials to bring about a peaceable settlement. It has been persistently rumored that unless a way is found to immediately end the strike, the Government may take over and operate the mills as an assurance that the shipbuilding program will not be held up. A few of the mills have agreed to the 8-hour demand, particularly several plants in Tacoma, which are furnishing lumber for the big army cantonment near that city, and the camp is reported to be receiving all the lumber needed. The threatened strike of 15,000 metal trades workers, which would result in closing the shipyards in Seattle, is not likely to materialize, according to union officials in the city. The question of boycotting the products of the Washington Iron Works, one of the reasons for the threatened strike, has been satisfactorily adjusted, as well as other questions of wages and shorter hours.

It is announced by Northwest representatives at Washington, D. C., that 95 per cent of all the spruce to be purchased by the United States Government for airplane construction will come from Oregon and Washington. It is understood that the aggregate amount for which contracts soon will be closed will probably exceed 75,000,000 ft.

Machine shops and manufacturing plants continue rushed with orders. A large number of the plants are operating continuously to keep up with the demand for equipment.

The George H. Gallagher Co., Spokane, manufacturer of farming machinery, plans to greatly increase the capacity of its plant.

Construction work at the Todd Shipbuilding Corporation's shipyards in Tacoma, Wash., is being rushed, and it is expected laying of keels for the four 7500-ton steel ships under contract will be ready by Sept. 1. The main buildings are nearing completion, and the 90 x 110 ft. power house will be erected shortly. Steel shed and mold loft will be 250 x 324 ft., two stories, with pile and concrete foundations.

The Foundation Co. of New York has leased a large site on the water front in Portland, on which will be built 10 sets of ways, the company holding contracts to build wooden steamers for the French Government. Charles F. Swigert, Portland, manager of the company.

The Coos Bay Shipbuilding Co., Marshfield, Ore., plans to immediately proceed with installation of the proposed shipyards in that city. Wooden vessels, 285 ft. long and 43 ft. beam, will be built.

George F. Rodgers, Astoria, Ore., recently leased a site in that city and has started work on construction of a shipbuilding plant. He has contracts for a number of wooden vessels.

The Kuhn Tractor Truck Co., Seattle, organized months ago for the building of trucks and other vehicles, plans early construction of a plant in Seattle. Several sites are now under consideration. William O. Kuhn, president, Gus Ehrenberg, vice-president and general manager.

The Kilbourne & Clark Mfg. Co., Seattle, manufacturer of wireless plants, will shortly move into its new home on the Seattle waterfront, where it will have one of the largest plants of the kind in the world. The company holds \$1,200,000 in contracts for the United States Government, and \$400,000 in contracts from private interests. The plant will be operated 24 hours a day, employing 400 persons. The main building of the new plant is a 2-story structure, 180 x 120 ft., with one-story frame extension in the rear at each side, 60 ft. sq. Electric power will be employed throughout the plant.

The plant of the Ballard Marine Railway Co. in Seattle is to be converted into a shipbuilding plant by the construction of new buildings and building of several ways.

The Granby Consolidated Mining, Smelting & Power Co., Anyox, B. C., plans to increase the capacity of its smelter from 2500 to 3000 tons daily, according to Jay P. Graves. A furnace, two large converters and other apparatus will be installed.

Steps have been taken toward the organization of the Columbia River shipbuilding concerns, near Portland, Ore., and Vancouver, Wash., for mutual benefit and to assist the government in speeding construction of vessels in that section. Twenty-five men, whose yards have contracts for millions of dollars' worth of steel and wooden vessels, attended a recent meeting at the Multnomah Hotel in Portland. The Columbia River Shipbuilders' Association was formed, with the following board of managers: H. E. Pennell of the Coast Shipbuilding Co.; Max Houser, McEachern yards, Astoria; William Cornfoot, Albina Engine & Machine Works; Joseph Bowles, Northwest Steel Co.; Fred Ballin, Supple & Ballin; F. C. Knapp, Peninsula Shipbuilding Co.

British Columbia machinery plants are considering the possibility of undertaking the manufacture of main engines for the Government steamers, although no contracts have as yet been placed with them. In figuring on the engines, the firms are faced with the prospect of having to install additional costly machinery, with contracts at a fixed price, and containing penalty clauses for late delivery, with no protection against strikes.

Birmingham

BIRMINGHAM, ALA., AUG. 4.

In addition to a steady demand for sawmill and mining machinery of all sorts, cotton gins and apparatus for cotton seed and peanut oil mills are quite active. Second-hand equipment is eagerly sought, but very little is to be obtained.

Hine-Hodge Lumber Co., Hodge, Miss., will build a shipbuilding plant on a 40-acre site.

Florida Marine Construction Co., Jacksonville, Fla., has been organized with a capital stock of \$100,000 to construct wooden vessels for the Government.

Poag & Co., Tampa, Fla., have secured a site for a shipbuilding plant to build schooners up to 600 tons capacity.

American Shipbuilding Corporation, Beaufort, S. C., has been incorporated with a capital stock of \$320,000. R. C. Horne, Jr., and W. E. Richardson are among the incorporators.

Universal By-products Co., Pittsburgh, Pa., proposes to establish a \$300,000 factory at Fernandina, Fla., to make a leather from shark skins.

McLain-Quick Lightning Switch Co., Anniston, Ala., has been incorporated to manufacture switches and switch appliances.

Kelly-Atkinson Construction Co., Chicago, has taken over the Hieronymous docks property at Mobile, Ala., to build 18 steam and wooden vessels for the Government.

Canada

TORONTO, ONT., AUG. 4.

Lieut. T. Harbon, purchasing agent, Military Hospitals Commission, "D" Unit, 1 Queen's Park, Toronto, Ont., will purchase the following workshop equipment to be delivered to Hart House, University Buildings, Toronto, during the week of Aug. 24 to 31: 1 Brown & Sharpe (or Cincinnati) universal miller, No. 1 (with improved spiral dividing head and swivel vise); 1 McKenzie engine lathe, 14 in. x 6 ft., with 8-in. 4-jaw independent chuck; 1 Barnes drill press, 15-in. with chuck and arbor; 1 3-hp. motor 110 d.c. compound wound (1200 to 1700 r.p.m.), Westinghouse or General Electric; 1 No. 2 American bench gas forge; 1 No. 3

Root's Acme blower; 1 No. 2 "perfect" power hack saw; set stock and dies, $\frac{1}{4}$ in. to $\frac{3}{4}$ in. (Little Giant); set stocks and dies, 1-64 in. to 14 in. (Little Giant); 1 Preston dimension saw, No. 125; 1 20-in. Sidney band saw; 1 Blount speed lathe, 11 in. x 5 ft.; 1 bench emery stand, 8 in. diameter x 1 in. wheel; 1 Universal grinder, No. 1, with automatic feed (Le Blonde); 36 ft. of 1 7/16 in. shafting; 1 pair couplings, 5 16-in. hangers.

Tender forms, specifications and drawings have been received from D. H. Ross, Canadian trade commissioner, Melbourne, Australia, for the supply and delivery of pumping plant and equipment for the Commonwealth naval dock yard, Cockatoo Island, Sydney, N. S. W., and are open for inspection at the Department of Trade and Commerce, Ottawa, Ont. (refer to file No. A-1901). Tenders addressed to either the director of naval contracts, care Commonwealth navy dockyard, Cockatoo Island, Sydney, N. S. W., close Oct. 10, 1917. The particulars are as follows: 2 main dock pumps with vertical spindle motors and control equipment; 1 vertical spindle motor and control equipment. 4 sluice valves, with 4 motors and control equipment; 2 drainage pumps with motors and control equipment; 2 exhaust pumps with motors and equipment; 1 inclosed motor and equipment for dock caisson.

Tender forms and specifications have been received from D. H. Ross, Canadian trade commissioner, Melbourne, for supply and delivery of auxiliary machinery for the Flinders naval base, via Melbourne, Victoria, and are open for inspection at the Department of Trade and Commerce, Ottawa, Canada (refer to file No. A-1901). Tenders addressed to the Director of Navy Contracts, Navy Office, Melbourne, close Oct. 24, 1917. The equipment required is as follows: 2 electrical driven air pumps, with complete set of spare parts; 1 steam driven air pump, with complete set of spare parts; 2 small circulating pumps; 1 large circulating pump; 1 large feed pump, with complete set of spare parts; 1 small feed pump, with complete set of spare parts, and 1 oil fuel pump, complete with spare parts.

The first carload of machinery for the shipbuilding plant now in course of construction on Poplar Island, New Westminster, B. C., by the New Westminster Construction & Engineering Co., has arrived on the site and the installation will be begun at an early date. The company has a contract for building four vessels for the Imperial Munitions Board.

The British American Shipbuilding Co., Ltd., Toronto, Ont., has been incorporated with a capital stock of \$1,000,000 by Francis H. Keefer of Thorold, Ont.; Andrew A. Kinghorn, Amy W. Chrysler and others of Toronto, to build ships, boats, drydocks, etc.

The Gaylord Engineering & Construction Co., Inc., of New York has been granted permission to carry on business of designing, building, etc., power plants, steam transmitting lines, heating and ventilating systems, etc., in Ontario with a capital stock of \$40,000, and has appointed William J. Elliott of Toronto attorney.

The Richmond Mfg. Co., Ltd., Toronto, Ont., has been incorporated with a capital stock of \$200,000 by Wilbert W. McKnight, Noubar Courian, Abraham Cohen and others of Toronto to manufacture munitions machinery, including chucks, gages, reamers, taps, cutters, etc.

The Pedlar People Ltd., Oshawa, Ont., is in the market for 6-ft. power squaring shears, with capacity to cut 16 gage sheets or lighter.

The Maxwell Motor Co., of Detroit will build a plant at Windsor, Ont., to cost \$150,000. R. Westcott has been awarded the contract. The building will be two stories, 100 ft. frontage and 300 ft. in depth. Automobiles for the Canadian and British Empire trade will be manufactured.

The American Can Co., Hamilton, Ont., proposes to build a large addition to its factory at a cost of \$125,000.

James, Loudon & Hertzberg, Ltd., Toronto, Ont., are preparing plans for a brass foundry to be constructed of brick and steel for the Mueller Mfg. Co., Sarnia, Ont., at a cost of \$100,000.

The Vancouver Shipyards & Engine Works, Ltd., Vancouver, B. C., proposes to build shipyards and shipbuilding plant at Vancouver. Manager S. Matheson, 517 Rogers Building.

Wells & Gray, Confederation Life Building, Toronto, have been awarded the contract for the erection of \$40,000 addition to the plant of the Nicholson File Co., Port Hope, Ont.

Evidence of the revival of shipbuilding in Toronto was strikingly manifest by the launching of three new boats. One of these was a 4300-ton freighter, the largest vessel yet built in the city; the other two were fishery protective vessels, which are being constructed for the Government. The freighter which has been named the "Orleans," was launched at the yards of the Thor Iron Co. and has been acquired by the Oriental Navigation Co., Nantes, France. She is 261 ft. long, 43 ft. beam and 28 ft. 3 in. of molded depth and is

equipped with triple engines of 1400 hp. The other two boats, named the St. Eloi and Festubert, were launched from the yards of the Polson Iron Works, and will form part of the fleet of six boats built for fisheries protection work. They are 140 ft. long, 23 ft. 6 in. beam and 13 ft. 6 in. molded depth. They will be equipped with compound surface condensing engines of 500 hp. and Howden water tube boilers, with down draught and working at 180 lb. steam pressure. They are the first of this type of boiler to be constructed in Canada, although they have been generally adopted in the British yards. The vessels are fitted with electric light, steam heated and have evaporating equipment. Every detail of the machinery and equipment is ready for installation, and it is expected to have the two vessels ready for delivery this month.

The ratepayers of London, Ont., will vote on a proposal to guarantee the bonds of the Ajax Rubber Co. to the extent of \$450,000. The company agrees to build and equip with machinery and manufacturing accessories a plant to cost at least \$300,000, in which it will manufacture 900 tires daily and employ 250 hands.

Strathroy, Ont., is asking for bids for a direct-connected motor driven turbine pump, 80 imperial gallons capacity, against a head of 20 ft. Apply Public Utilities Board, Strathroy, Ont.

Plans have been placed in the hands of the Ontario Hydro Commission, Toronto, for its endorsement in connection with the erection of a hydro station at Galt, Ont. As soon as the indorsation has been completed bids will be called for the construction of the plant.

The Laurin & Leitch Construction Co., Montreal, Que., has been awarded the general contract for the erection of a pumping and filtration plant at St. John's, Que.

An appropriation of \$55,000 has been made for harbor work at Goderich, Ont., in connection with the establishing of a shipbuilding plant there by the Goderich Shipbuilding Co. The work includes the construction of slips, etc.

The Eureka Shipbuilding Co., Ltd., North Head, N. B., has been incorporated with a capital stock of \$32,000 by F. Ingersoll, J. E. Gaskill, F. L. Lakeman and others to build ships, boats, etc.

Government Purchases

WASHINGTON, Aug. 6.

Bids will be received by the Bureau of Supplies and Accounts, Navy Department, Washington, until Sept. 4, schedule 1379, for one motor-driven centrifugal pump for Pearl Harbor, T. H.; schedule 1387, opening date unassigned, for one open-side surface-grinding machine, for South Charleston, W. Va.; schedule 1388, opening date unassigned, for two heavy-duty milling machines and two back-gear turret screw machines for Philadelphia; schedule 1389, opening date unassigned, for one 100-in. vertical boring and turning mill for Boston; schedule 1395, opening date unassigned, for one 15-ton locomotive crane for Charleston, W. Va.; schedule 1396, opening date unassigned, for one motor-driven radial drill for Mare Island; schedule 1397, opening date unassigned, for one motor-driven centrifugal pump for Norfolk, Va.; schedule 1400, opening date unassigned, for two motor-driven lathes for Fort Mifflin.

Bids will be received by the Bureau of Yards and Docks, Washington, until Aug. 13, for furnishing and installing eight electric mono-rail hoists, mono-rail track, supports, switches, turntables and trolley rails in the new foundry at the navy yard, Norfolk, Va., specification No. 2481.

Bids were received by the Bureau of Yards and Docks, Navy Department, Washington, specification No. 2464, for furnishing cranes for the smithery addition at the Philadelphia navy yard.

Item 1, for the work complete; 2, one 80-ton crane complete with spare parts; 3, one 15-ton, two 5-ton bridge and four 5-ton wall cranes with spare parts; 4, one additional 15-ton crane complete; 5, price per foot installed for runway circuit consisting of two No. 2-0 B. & S. gage, bare copper wires; 6, price per foot installed for runway circuit of two No. 4-0 B. & S. gage copper wires.

Chesapeake Wire Works, Westport, Md., item 3, \$68,335, 120 to 270 days; 4, \$16,475, 160 days; 5, \$1, 120 days.

Niles-Bement-Pond Co., 111 Broadway, New York, item 1, \$108,610, 420 days; 2, \$43,750, 420 days; 3, \$64,860, 390 days; 4, \$14,400 each, 390 days; 5, \$1 per ft. of buildings; 6, \$1.50.

Morgan Engineering Co., Alliance, Ohio, item 1, \$52,125; 2, \$18,475; 3, \$23,780; 4, \$54,780; time, 240 to 270 days.

Bids were received July 30 by the Bureau of Yards and Docks, Navy Department, Washington, under specification No. 2443 for furnishing electric traveling cranes for extension to machine shop at the navy yard, Mare Island, Cal.

Item 1, price and time of delivery for one 40-ton and one 15-ton crane, complete, with spare parts; 2, for one 40-ton crane, complete, with spare parts; 3, one 15-ton crane, complete, with spare parts; 4, one additional 15-ton crane, complete; 5, price per foot for runway circuit consisting of two No. 2-0 B. & S. gage, hard-drawn, bare copper main collector wires, insulating brackets, and take-ups; 6, price per foot for a runway circuit consisting of two No. 4-0 B. & S. gage, hard-drawn, bare copper main collector wires, insulating brackets and take-ups.

Chesapeake Iron Works, Westport, Md., item 3, \$23,520, 155 days; 4, \$22,320, 165 days; 5, 90c., 155 days.

Niles-Bement-Pond Co., 111 Broadway, New York City, item 1, \$47,000; 390 days; 2, \$28,300, 390 days; 3, \$18,700, 390 days; 4, \$17,320, 390 days; 5, 75c. per ft. per building; 6, \$1.25.

Morgan Engineering Co., Alliance, O., item 1, \$38,950; 2, \$25,175, 270 days.

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